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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

June 21, 1973

SUBJECT: U.S./U.S.S.R. Environmental Agreement

FROM: Dr. John Buckley *J. Buckley*

TO: Jack Perry, Council on Environmental Quality  
Richard Christiansen, EURISOV, Room 4225, Department of State  
Raymond Pardon, EURISES, Room 5227, Department of State  
William B. Davey, Soil Conservation Service, U.S. Department  
of Agriculture

Attached for your information is a copy of the final  
report of the U.S. Water Pollution Group which visited the U.S.S.R.  
under the Bilateral Environmental Agreement.

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*Environment*  
*Water Pollution*

Report of  
U.S. Water Pollution Section of  
U.S.—USSR Joint Working Group on Cooperation  
in Water Pollution Prevention  
Moscow, March 20-23, 1973

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### Summary Report

The first meeting of the U.S.-USSR Joint Working Group on Cooperation in Water Pollution Prevention established under the Agreement on Cooperation in the Field of Environmental Protection met in Moscow March 20-23 and agreed with Soviet water pollution officials on a program of cooperative activities. The seven-member U.S. delegation was led by Dr. John Buckley, Deputy Director, Office of Research, Environmental Protection Agency (EPA) and was comprised of officials of the EPA and the Council on Environmental Quality. The Soviet delegation was headed by Boris G. Shtepa, Deputy Minister for Reclamation and Water Management and was composed of officials from Soviet agencies and research laboratories concerned with water pollution control. A list of the U.S. delegation and Soviet participants is attached at Tab A.

#### Background

The Water Pollution Working Group was established under the Agreement on Cooperation in the Field of Environmental Protection, signed by U.S. President Richard M. Nixon and Chairman of the Presidium of the U.S.S.R. Supreme Soviet N.V. Podgorny in Moscow on May 23, 1972. The Agreement is designed to establish close and long-term cooperative measures and programs between the two countries in eleven specific environmental areas, of which water pollution is one.

Chairman Russell E. Train, Chairman of the U.S. Council on Environmental Quality and Academician E. K. Fedorov, Director of the Soviet Union's Hydrometeorological Service signed a Memorandum of Implementation of the Agreement in Moscow on September 21, 1972.

#### Working Group Discussions

Delegation leaders opened discussions at the Soviet Ministry of Reclamation and Water Management expressing the importance of environmental cooperation and their hopes for the discussions. They emphasized the similarity of approaches to water pollution control in each country, the need to plan for resource use and preservation, the problems of industrialization and population concentration and the expected benefits to both sides from sharing of information and experiences and conducting joint projects.

The agreed Working Group Program is attached at Tab. B. At U.S. suggestion each delegation gave a general description of its country's organizational framework for dealing with water pollution. Dr. Buckley, Mr. Strelow and Mr. Pisano described the

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U.S. Federal Government organizations and their responsibilities and outlined Federal-State relations providing pertinent documents. The Soviet delegation furnished two documents summarizing water pollution control activities in the USSR—"Water Conservation and Reasonable Use of Water in the USSR" and "Basic Principles of the Water Legislation of the USSR and Union Republics." The Soviet documents are included at Tab C. A listing of U.S. documents provided to the Soviet team during the meeting is attached at Tab D.

The delegations agreed to follow the definition of work outlined in the September 21, 1972 Memorandum of Implementation which included (1) studies and modelling of river basin pollution, (2) protection and management of lakes and estuaries, (3) effects of pollutants on aquatic ecosystems and permissible level of pollution, and (4) prevention and treatment of waste discharges. Sub-groups for each of these sections were established. The following officials were named to head the subgroups: on the U.S. side, Group I, Mark Pisano; Group II, Arnold Joseph; Group III, Donald Mount and; Group IV, Kenneth Johnson. On the Soviet side, subgroup leaders were Group I, V. R. Lozansky and F. Ya. Rovinsky; Group II, A. A. Zenin and E. Eremenko; Group III, Professor G. G. Vinberg and; Group IV, Professor S. V. Yakovlev.

Each side proceeded to outline its objectives and approaches to possible joint work in each of these four major areas and at U.S. suggestion these discussions were continued in the sub-group sessions. A summary of the initial presentations and sub-group discussions is attached at Tab E.

#### Agreed Program of Cooperative Activities

At the conclusion of the sub-group talks, Dr. Buckley and Deputy Minister Shtepa signed a Record of Discussions (Tab F) delineating a number of agreed specific cooperative projects in each of the four broad areas of interest to the Working Group.

Highlights of this agreed program include:

1. Studies and modelling of river basin pollution: A two-part project was agreed upon to develop and implement water pollution control strategies for intensively developed river basins and a comparative evaluation of the costs of achieving specified water quality objectives in each country. The project will focus on the Moskva and the Seversky Donets Rivers in the USSR and the Delaware, Ohio and other rivers in the U.S., and will encompass river basin planning, modelling and monitoring techniques.

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Under the project a Soviet water pollution team will visit the U.S. in the summer of 1973 to study pollution control activities on the Delaware and Ohio Rivers and to join in outlining a program for the river basin project plans which will be developed in each country. In 1974 Soviet and U.S. specialists will visit the project areas as required. In the fall of 1975 the USSR will sponsor a symposium to evaluate the results of the plans and compare cost evaluations.

2. Protection and Management of lakes and estuaries: This agreed project would make comparative investigations of Lake Baikal in the USSR and the Great Lakes (particularly, Lake Superior) and Lake Tahoe in the U.S. to understand and prevent pollution in lakes. These lakes have a number of common physical characteristics; Lake Baikal and the Great Lakes contain nearly 40 percent of the world's lake water. The population and land development and activities at Lake Tahoe are similar to those at the southern end of Lake Baikal. All are experiencing pollutant inputs and consequent adverse effects on water quality.

To conduct the project U.S. scientists will visit Lake Baikal in August 1973, and Soviet experts will visit Lake Tahoe and the Great Lakes in September 1974. These exchanges will be designed to compare methods of lake studies and data analysis and to enhance the scientific understanding of in-lake processes needed for management decisions. In the spring or fall of 1975, plans are being considered for a joint symposium with group I in the USA on mathematical modelling of the processes involved in formulating water quality criteria. In the spring of 1976 a symposium in the USSR may be held on methods of planning and management for preventing lake and estuary pollution.

3. Effects of Pollutants on aquatic systems and permissible levels of pollution: This project area will study pollution effects, processes and forecasting and examine and compare methodologies for establishing water quality standards. Information developed should be of benefit directly in implementing U.S. requirements for controlling the discharge of polluting substances. Of particular interest on the U.S. side is the means for determining water quality standards for bathing in the USSR.

The project will develop initially through a broad exchange of technical information, to be followed by the visit of Soviet experts to the U.S. in the summer of 1974 to participate in a symposium of pollutant effects on ecosystems and a visit of U.S. specialists to the Soviet Union in 1976.

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4. Prevention and treatment of waste discharges: This project would develop joint activities in waste water treatment, in particular, to improve water supply recycling in pulp and paper plants, municipal and industrial waste water treatment plants, recycling of oil refinery waste water treatment and treatment and disposal of municipal and industrial waste residues.

During the Working Group discussions the Soviet delegates expressed particular interest in (a) advanced waste treatment technologies for the oil refinery and the pulp and paper industries, especially those that employ extensive recycling and re-use of waste water; (b) continuous automated monitoring equipment and procedures; and (c) methods of mathematical modelling and planning based upon the use of models. The U.S. participants were especially interested in learning more about the extensive Soviet experience in the use of sewage effluent and sewage sludge in land reclamation and disposal. We also would seek to gain Soviet toxicology data to supplement our knowledge in this field.

The project would be conducted through broad exchanges of technical information in areas of interest to each country by August - October 1973. These exchanges would be followed by a visit of U.S. technical experts in each of the major project areas to the USSR in December 1973. The visit will include joint conferences and site visits; additional more detailed collaboration in specific areas of interest will be delineated at that time. Soviet experts will visit the U.S. in mid-1974. During these visits the host countries will display specific control technologies of interest to the visiting delegations.

#### Concluding Session, Press Conference and Reports

At the concluding session the Working Group agreed to convene its next meeting in Washington during the spring of 1974.

At U.S. request members of the press and other news media were invited to observe the signing ceremonies and concluding ceremonies and to participate in a press briefing conducted by Deputy Minister Shtepa and Dr. Buckley. Other members of both delegations took part in the briefing which drew correspondents and questions from the "New York Times", "Christian Science Monitor", Associated Press and United Press International. Dr. Buckley conducted interviews later with Radio Moscow, Soviet Life Magazine and Group W News. Pravda and Tass reported favorably on the meeting.

The delegation made a preliminary report of its discussions in Embassy Moscow telegram #3193 dated March 23. It also prepared a press release for local use and a radio news release for use in the USIA wireless file.

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### Field Visits

During the visit in Moscow Soviet officials arranged for the U.S. team to visit the largest of the Moscow waste water treatment and aeration plants, an experimental storm water treatment facility, the Likhachev (Zil) Automobile plant in Moscow, the Moscow-Oka Basin Inspection Organization and a number of cultural sites. A summary of the technical site visits is attached at Tab G.

### Comments on the Working Group Meeting

The delegation to the Working Group meeting believes this first session of the Working Group has been a highly successful one. The interests and objectives of both sides were essentially similar, and no substantive disagreements occurred. The work program agreed upon covers a wide range of mutual interests which can be pursued now and later extended or enlarged. It is clear that the Soviet delegation places high priority on the program developed. They devoted every attention to the meeting, providing continuous high-level attention and high quality technical competence. They were cooperative in all respects, accommodating willingly a number of changes to the agenda and final work program suggested by the U.S. delegation. They chose to use the U.S. prepared press release as their own. They furnished excellent interpreting, translating and secretarial facilities, and provided first class accommodations and arrangements for cultural and site visits.

Officials of the U.S. Embassy in Moscow assisted the delegation in comparing the Russian and English texts, making visit arrangements, transmitting reporting telegrams, and in acting as host for a reception of water and air officials.

Media interest in the discussions was high and the reports seen were favorable.

### Observations and Evaluation

Economic incentives are being used effectively to improve waste treatment practices at the Likhachev automobile plant. The influent streams to the treatment plant are monitored and their usual composition known. If the oil content increases, the unit sending the oil is charged for additional treatment cost; if it lessens, the unit receives eight rubles a ton for the amount recovered (which in turn is sold at 28 rubles a ton by the waste treatment plant). We were also told that fines are now levied against the plant manager and engineer in charge of waste treatment rather than against the plant, and that this system is "more effective but less comfortable" to work under.

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The Soviets are not just talking about pollution control. They are actively improving their treatment systems. For example, the experimental storm water treatment facility is apparently new since last July. It consists of a settling basin from which oil is skimmed and burned. Storm run-off is a major source of pollution in the Moscow River. In the winter snowremoval and dumping in the river is the largest source of pollution, and will be discontinued after this winter. (Presumably, it will be dumped in settling basins as described above.)

Considerable attention was paid to showing us the best of Moscow and having us participate in social and cultural activities. This seems beyond that required in ordinary hospitality related to a technical exchange. The aspect of cultural exchange within the Environmental Agreement is apparently important to the Soviets, and certainly is to us. It is important that U.S. delegations be properly briefed, so that they participate fully in cultural activities without feeling that they are short-changing their technical obligations. It may be necessary to schedule additional time to assure that technical discussions are completed. Not more than 3 or 4 hours of meetings per day are tolerable, and with time required for interpretation, this represents effectively 1 1/2 to 2 hours a day. It is important that we do an equally effective job with Soviet delegations here. Substantial efforts will be necessary, with help from CEQ and State, to do so.

LIST

of the Participants at the First Session  
of the US-USSR Joint Working Group on  
Water Pollution Prevention

US Side

Dr. John Buckley	-Deputy Director, Office of Research, Environmental Protection Agency, Chairman of the US Section
Mr. Mark Pisano	-Acting Director, Water Planning Division, Environmental Protection Agency, Member of the Working Group
Mr. Arnold Joseph	-Chief, Fate of Pollutants Studies, Environmental Protection Agency, Member of the Working Group
Dr. Donald I. Mount	-Director, National Water Quality Laboratory, Environmental Protection Agency, Member of the Working Group
Mr. Kenneth Johnson	-Deputy Director, Division of Muni- cipal Waste Water Systems, Environmen- tal Protection Agency, Member of the Working Group
Mr. William H. Mansfield	-Director of Bilateral Programs Office of International Activities, Environmental Protection Agency
Mr. Roger Strelow	-Senior Staff Member, Council on Environmental Quality

USSR Side

Shtepa B. G.	-Deputy Minister for Reclamation and Water Management, Chairman of the Soviet Section
Lozansky V. R.	-Director of the All-Union Scientific Research Institute on Water Protecti- on (VNIIVO), The USSR Ministry for Reclamation and Water Management, Deputy Chairman

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Zenin A. A.	-Director, Institute of Hydrochemistry, Hydrometeorological Service of the USSR, Deputy Chairman
Vinberg G. G.	-President of Hydrobiological Society Institute of Zoology, USSR Academy of Sciences, Member of the Working Group
Yakovlev S. V.	-Director, All-Union Research Institute for Water Supply, Sewage, Hydraulic Structures and Engineering Hydrogeolo- gy (VODGEO), USSR Gosstroi, Member of the Working Group
Filippov V. I.	-Director, Moscow Scientific Research and Design Institute for Water Supply and Sewage, Moscow Executive Committee, Member of the Working Group
Rovinsky F. Ya.	-Head of the Department, Institute of Applied Geophysics, Hydrometeorological Service of the USSR, Member of the Work- ing Group
Kolesnikov L. N.	-Deputy Chief, Department for Scientific and Technical Cooperation with Foreign Countries, USSR Ministry for Reclamati- on and Water Management, Member of the Working Group
Korbut S. F.	-Economist, Department for Scientific and Technical Cooperation with Foreign Countries, USSR Ministry for Reclamation and Water Management, Member of the Working Group, Secretary.

Other Participants

Eremenko, E. V.	-Chief of Hydraulic Research Laboratory, Khavkov All-Union Institute of Water Pollution, Ukraine, SSR
Znamenskii, V. A.	-Chief of State Hydrology Institute
Sedunov, V.	-Translator

Tab B

Agenda of the Meeting of

US-USSR Joint Working Group on Prevention of Water Pollution

Moscow, March 20-24, 1973

March 19

Monday

Arrival of U.S. delegation, "Scheremetievo-I" airport, Hotel Russiya

March 20

Opening of the Working Group Session

Tuesday

10:00 - 15:00

1. General discussion of cooperative program
2. Broad discussion of projects in all areas

17:00

Sightseeing in Moscow

19:00

Dinner for U.S. delegation by Soviet delegation

March 21

Wednesday

10:00 - 14:00

Working Groups I-IV meet

15:00 - 17:00

Visit to Kuriyanovo sewage treatment and aeration station

19:00

Opera at the Palace of Congresses

March 22

Thursday

10:00 - 14:00

Working Group Sessions Continued

15:00 - 17:00

Study waste of the Moskva-Oka Basin Inspection and visit to the treatment facilities of the Likhachev Automobile Plant

18:00 - 20:00

Reception for Soviet water and air pollution delegations at the U.S. Embassy

March 23

Friday

10:00 - 12:00

Final agreement on cooperative program and  
signing of record of meeting.

Concluding ceremonies

Press Conference

**WATER CONSERVATION AND REASONABLE USE  
OF WATER IN THE USSR**

# 1. State System of Water Resources Conservation Activity

USSR's state system of water conservation activity provides technical, economical, legal and organizational sides of the water conservation policy.

The management of water relations in the USSR is fulfilled on the basis of "Basic principles of water legislation of the USSR and Union republics" and other Acts issued in accordance with the "Basic principles".

In the USSR the waters are exceptional state property, i.e. all-national property and they can be only granted for application. It is not allowed to breach rights of state property on water resources.

Unified state water fund consists of items which are as follows:

- rivers, reservoirs, lakes, channels, ponds;
- underground waters and glaciers;
- inland seas and USSR's territorial waters.

The state management of water conservation activity is performed by the Councils of Ministers of the USSR, union and autonomous republics and executive committees of the regional Councils of deputies of working people and special authorize bodies.

The special authorized bodies are as follows:

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- Ministry of Reclamation and Water Management of the

- Ministries of Reclamation and Water Management of the union republics,

- all-union and republican bodies of reclamation and water management,

- basin boards which are under authority of above-mentioned Ministries and bodies.

There are also other local authorities under the Ministry of Reclamation and Water Management of the USSR.

In accordance with the USSR's water legislation all the waters (water projects) must be protected against pollution, contamination and depletion causing damage to public health; reduction of fish stocks; impairment of water supply conditions and arising other adverse effects due to changes of the physical, chemical and biological properties of water, decreasing its capability to natural self-purification and infringement of hydrological and hydrogeological conditions of the waters.

The enterprises, organizations and plants operation of which affects the conditions of waters have to carry out technological, reclamative, agricultural, hydrotechnical, sanitary and other measures providing for protection of waters against pollution, contamination and depletion, as well as improvement of state and conditions of waters.

The water conservation measures are included into the state plans of national economy development:

It is prohibited to discharge industrial, domestic wastewaters and other disposals (except irrigation sewage) into the water streams.

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The companies having boats, ships, pipelines, floating units and structures constructed and operated on the water complexes, and companies dealing with rafting, have to keep water streams out of pollution and contamination which can occur due to leakage of oil, petroleum and chemical products and loss of timber.

It is prohibited to pollute and contaminate surfaces of catchments, ice covering of reservoirs with various industrial impurities and petroleum and chemical products which can impair the water quality.

Management boards of state water resource systems, collective farms and state farms have to prevent water streams against pollution with fertilizers and chemical weed-killers and pest-killers.

The areas and zones of sanitary protection are established to prevent waters used for drinking and domestic water supply, medical and recreation purposes, against pollution.

The proper water conservation activity is greatly advanced by the science-based terms and requirements of water use in the USSR which have been laid down in the USSR's water legislation.

The further development of state system of the water resources conservation has been forwarded by the Act of the Central Committee of the CPSU and the Council of Ministers of the USSR dated December 29, 1972, No.898 and to be referred as "Improvement of environment protection and application of natural resources".

In this Act the functions and duties of separate Ministries and Authorities dealing with nature resources conservation activity (including the water resources) have been specified and concrete tasks on solving the paramount matters of environment protection have been given.

In the USSR great attention is paid to development of the rules of water conservation while using these waters.

In our country "Rules of protection of surface waters against pollution with wastewaters" are now in force (No.372-61). These "Rules" are approved by the Ministry of Public Health of the USSR and agreed upon by the State Construction Committee in 1961.

In accordance with these "Rules" the preventive measures against pollution of open water bodies used for drinking and domestic water supply as well as for fishery are to be carried out. The discharge of wastewaters containing valuable by-products which can be utilized is prohibited; discharge of wastewaters which can be utilized for circulating water system is banned; discharge of contaminants into the closed water bodies having no self-purification capability is also banned; the standards on water quality of waterbodies to be used for drinking and municipal water supply and for fish economy purposes have been established. The properties and composition of water are shown in the Appendices to "Rules". These factors of properties of water have to be kept at the control stations of water application. Appendices are as follows:

- No.1 - General requirements on composition and properties of water of water bodies located nearby the stations of water application for drinking and cultural purposes;

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- No.2 - Maximum allowable concentrations of harmful products in water of reservoirs to be used for sanitary and domestic purposes (No.847-70);

- No.3 - General requirements on composition and properties of water of water bodies to be used for fishery;

- No.4 - Maximum allowable concentrations of radioactive products in water of water bodies and water supply sources;

- No.5 - Maximum allowable concentrations of some harmful products in water of fishery reservoirs.

The given Appendices are periodically revised.

In the USSR the "Rules of sanitary protection of shoreline areas of the seas" (No.483-64) are also in force at present time. When drawing up these "Rules" the scientific and organizational principles laid down in the "Rules of protection of surface waters against pollution with the wastewaters" have been used as a basis and at the same time the specific features of seas have been taken into account.

The Act dated August 31, 1972 and issued by the Ministry of Agriculture of the USSR, Ministry of Reclamation and Water Management of the USSR and Ministry of Fish Economy of the USSR to be titled as "About measures on preventing pollution of fishery water bodies with weed-killers and pest-killers" has set up the sizes of sanitary protection zones and rules of pesticide application.

In the USSR at present the sanitary rules of storage, transportation and application of pesticides in agriculture are also in force. These rules formulate on a wider scale the organizational aspects of water conservation activity.

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The hygienists, toxicologists and ecologists have been thoroughly studying the properties of new types of pesticides for a long time before a decision on possibility of its application in agriculture has been taken. In our country an application of some high toxical stable preparations as D.D.T., aldrin, dieldrin, endrin, chloridin is banned, the production of mercaptophos is also banned.

Over the last ten years an improvement of conservation technique of water resources has been mainly provided by introducing the effective methods of wastewaters treatment, maximum water application in the closed water supply systems; application of treated wastewaters, introduction of technological production processes allowing to decrease or exclude application of water and discharging the harmful products with wastewaters at all, and application of wastewaters for irrigation of agricultural lands.

At present the most practical results have been obtained in the field of wastewaters treatment and application of circulating cycles of the water supply.

Over the last five years an increase of efficiency of operating water treatment facilities and putting into operation the new ones, introduction of circulating cycles of the water system, allowed to improve substantially water treatment quality, to reduce flow rate of untreated wastewaters and to save more fresh water. As a result of these facts, an improvement of water quality of some water bodies and river stretches located on the territory of Russia, Ukraine, Lithuania and other republics of the USSR has been obtained and fur-

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At present in the field of mechanical treatment water treatment installations operating on the principle of removal of insoluble residues in the centrifugal forces field are on the threshold of putting into service on an industrial scale. These installations include hydrocyclones and centrifuges which have high capacity, fully integrated and enable to remove mechanical residues having given hydraulic granularity from the wastewaters.

The filtration technique of wastewaters through the grained layers of packing and microfiltration screens are used on a larger scale.

In the USSR there is a lot of innovations in the field of biochemical treatment of wastewaters which are now on the threshold of the widespread application. These innovations are as follows: two-stage process of wastewaters treatment in the air tanks; technological schedules combining the previous anaerobic treatment of high concentrated wastewaters with successive treatment in the air tanks; compacted aeration installations (air accelerators, biotanks and others); oxidation channels; application of technical oxygen for aeration and others.

The up-to-date investigations have shown that any degree of wastewaters treatment can be achieved by means of application of the chemical and physico-chemical methods of water treatment including an oxidation of organic impurities with active oxidants (ozonization, superchloridation); coagulation; flocculation; sorption on the activated coals and ion exchange resins; microfiltration and others.

Due to the high costs the application of the abovementioned treatment methods is however limited. Water treatment methods and installations which are now used for after treatment of wastewaters, are very often non-efficient from the point of view of economics.

An application of wastewaters for irrigation purposes takes a certain place in the number of water conservation measures.

The areas of wastewater irrigated lands approximate 87 thousand hectares. For irrigation purposes the treated wastewaters of sugar, starch and hydrolysis industries and town treated wastewaters are used.

Some activity on application of wastewaters of cattle-breeding farms for irrigation purposes has been started. The positive results of influence of wastewaters irrigation on the soil fertility have been obtained. In the USSR agricultural application of wastewaters is handled with special sanitary rules.

The burning method for liquidating small volumes of highly concentrated and highly toxic wastewaters is being used.

At present there is an urgent problem dealing with disinfection and removal of substantial volumes of deposits settled in the treatment installations. Over the last years this problem is being successfully solved by means of noticeable improvement of dehydration processes, thermal drying process and deposits burning process as well as by fabricating and introducing highly productive filtre-presses.

The discharge of the heated wastewaters from the thermal power station causes continuous, and sometimes, substantial

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ing complexes. This problem cannot be only settled everywhere by means of agricultural application of wastewaters and its soil purification as they are needed to be disinfected. Under the existing cattle-breeding technology the application of pre-treated wastewaters for technical water supply (hydro-cleaning and manure transportation) is the perspective concept as it allows to use circulating water supply system in agriculture as it has been done in industry. It is, however, necessary to develop effective methods of extraction of solid phase from the wastewaters and methods of its processing to market products.

The prevention of discharge of chemical products of the agricultural production with the surface run-off into the water bodies takes special place in water resources conservation activity in the USSR.

At present the substitution of chemical methods of plant protection with biological ones takes place as well as application of granulated chemical preparations and implementation of agricultural measures including the measures against soil erosion. All the abovementioned measures are taken side by side with implementation of preventive measures having the organizational and sanitary character and connected with improvement of management methods of agriculture and methods to control pests, diseases and weeds.

The new types of ship separators have been developed for treatment of ballast waters as well as technological schedules of the shore treatment installations designated for receiving and disinfection of these wastewaters. The rafting is channel

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increase of water temperature depending on a season of the year and flow rate of wastewaters which in its turn causes change in the chemical and biological composition of water.

At present the measures used against thermal pollution are as follows: arrangement of different cooling installations for thermal waters: water cooling towers, ponds and others; increase of quantity of circulating water which in its turn provides reduction of volume of heated waters discharged into the water source. The given measures are however the only effective ones in the cases of thermal stations having small and medium powers and small flow rates of water. In all likelihood these measures cannot be applied for large thermal and power stations and in this respect the settlement of the problem aimed at protection of multipurpose water bodies receiving the heated waters is needed to be found.

The mine waters form special category of industrial wastewaters. In some cases they can cause excessive mineralization of waters. Due to the great volume of mine waters and high cost of desalination process the reduction of mineralization level of these wastewaters is not perspective concept.

The measures directed at preventing the formation of the mine waters by means of drying mine fields, are more effective in the sense of prevention of water pollution in water bodies with mine waters.

In connection with conversion of cattle-breeding to industrial basis the complicated problem arises. This problem deals with disinfection of the great amount of highly concentrated

wastewaters flowing-in from large cattle-breeding and process-

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Over the last years certain achievements have been gained in investigating intensification of the self-purification processes in water bodies. The methods of intensification of self-purification processes by means of mechanical and pneumatic aeration are known and widely applied in our practice. For these purposes the hydroturbines, dams and cascaded complexes are widely used.

In accordance with the "Basic principles of water legislation of the USSR and union republics" it is banned to put into operation a complex having no water treatment installations. The managers of construction companies will not be given the bonuses if they do not put into operation treatment installations in proper time.

Water Resources Application Authorities have the right to shut down the existing enterprises if surface or underground waters are polluted during its operation. These Authorities are able to fine managers of enterprises and separate people who will break water application regulations and in the dangerous cases connected with natural waters pollution the strict disciplinary measures are able to be applied to.

To save fresh water the water application norms per product unit have been developed and are being introduced in all the branches of industry.

In the USSR construction of water-resources complexes is financed by the appropriate Ministry, in particular construction of single-purpose agroindustrial complexes.

The long- and short-term loans are given by the State Bank for construction and repairing the city and industrial

canalization systems and water treatment stations, for implementation of closed water supply and water reuse system, for purchase of equipment, for extraction of valuable by-products contained in the wastewaters, etc. The abovementioned measures assist greatly in improving the quality of natural waters and its economical consumption.

Up to now water management in the USSR has achieved the high level of development and can be considered as an important branch of national economy having basic capital productive funds greater than 25 billion roubles.

The wide program for construction of water-resources complexes are planned to be performed in the near future. The substantial part of the planned expenditures will be spent for construction of the water conservation complexes.

In the USSR optimal distribution of capital investments to be spent for implementation of water conservation measures is considered at the different stages which are as follows:

- determining the volume of capital investments to be given to this branch of water economy;
- studying the feasibility of different water conservation measures;
- determining the sizes and parameters of complexes and operational regimes of systems;
- determining the volume of capital investments to be invested in the national economy, as a whole, and in the water resources conservation measures, in particular, the planning bodies take into account the perspective schedules of combined application and conservation of water resources which have been

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developed taking into consideration the social-economical tasks of the national economy plan.

2. State control over conditions  
and conservation of water resources

In the USSR the permanent bodies implementing state supervision over application and conservation of water resources have been established. These bodies perform daily supervision over observation of rules of surface waters protection against pollution. In eleven union republics this water conservation service is under authority of the Ministry of reclamation and water management of the union republics. In Estonia this service is under authority of the Committee of reclamation and water management of the Council of Ministers of the Estonian Soviet Socialist Republic. In the four republics (Azerbaijan, Armenia, Georgia, Byelorussia) this service is under the authority of the Council of Ministers of the union republics.

The coordination and general management of activity of republican bodies of water resources application and conservation is performed by the Ministry of Reclamation and Water Management of the USSR. The 85 republican basin and zone inspection bodies with the hydrochemical laboratories have been established for supervision over conditions of water resources. As a rule, the scope of activity of inspection body includes the river basin or part of large river basin.

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Each basin inspection body has the central hydrochemical laboratory and certain part of river basin is served by subsidiary hydrochemical laboratories.

All the complexes consuming water greater than 100 m<sup>3</sup> per day and discharging wastewaters are under supervision of the basin inspection bodies. By January 1, 1972 81 thousand complexes have been under supervision of inspection bodies. Basin inspection bodies systematically look after the state of water consumption and water discharge with special emphasis to the improvement of technological processes of production as well as operation of treatment, disinfection and utilization shops of each plant. An influence of plant wastewaters on the water of water bodies - reception reservoir of wastewaters - is being investigated. Both inspection bodies and plant engineers develop the measures on improvement of water conservation structures and increase of its operational efficiency; dates of realization of the abovementioned measures are fixed and permanent control over its implementation is carried out.

Basin inspection bodies systematically look after the course of construction of the water conservation structures and the realization of capital investments given by the State for these purposes.

In accordance with the Law in force the new plants to be put into operation have to be equipped with appropriate water treatment installations. In the case of absence of these installations the new plants will be not allowed to be put into operation. With the purpose of strict observa-

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tion of this law the representatives of the State supervisory body of application and conservation of water resources are included into the team of state reception commissions. In the case of breakage of this law the representatives of the State supervisory bodies can impose a ban on putting into operation the plant. In 1971 2018 water treatment installations were put into operation out of 4361 treatment installations prepared for commissioning. The representatives of the State supervisory bodies have taken part in activity of 1906 commissions involved in choosing the construction sites for water treatment installations. Within the period from 1968 to 1970 8200 large water treatment plants were put into operation.

The bodies of the Main Department of Hydrometeorological Service are in charge of studying the chemical composition of the surface waters and its changes under influence of man's activity as well as drawing up the reports of a state of water quality of the water sources. For carrying out these reports the Hydrometeorological Service has the sampling stations which are located in the water basins of the country taking into account the distribution of industrial, domestic and agricultural wastewater discharge and density of population.

The surveying of different areas and separated water objects important for national economy are periodically carried out.

From 1964 to 1970 the quantity of supervisory stations of Hydrometeorological Service has increased five times.

In 1970 the surveys were carried out at 700 water objects (lakes, water bodies, channels, rivers).

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At each station surveys are carried out at several sites: upstream of possible source of pollution and downstream of it at different distances from the pollution source. On the lakes and reservoirs the sites were set up in the same manner. In water bodies having slow water exchange the vertical is outlined in the open part of reservoir which is not affected with pollution. As a rule, at cross sections located downstream of possible source of pollution water samples are taken at several verticals from the different levels.

In accordance with the standard methods developed and tested by the Hydrometeorological Service the qualitative factors and ingredients are determined in water samples, taken at different sites. The qualitative factors and ingredients are as follows: dissolved oxygen, BOD<sub>5</sub>, oxidizability (bichromate and permanganate), ammonium ion, nitrate ion, ferrum, copper, zink, chromium, nickel, phenols, extracted substances (including petroleum products), magnesium, chlorides, sulphates, sum of ions, fluor, cyanides, arsenic, lead and others.

The maximum allowable concentrations of harmful products in the reservoir water are chosen as a criteria at evaluating the degree of pollution of surface waters of the country.

Quarterly hydrochemical bulletins issued by the separate departments of the Hydrometeorological Service are the basic summarization of data on the degree of contamination of the surface waters.

From 1968 the storm service is introduced in the system of Hydrometeorological Service. Its tasks are as follows:

- detecting the high level of contamination of the surface waters;

- transmitting the urgent information to all bodies interested in it.

At present research and development investigations directed at improving the existing methods of contamination control of the natural waters as well as determinating the special features and interconnection of pollution sources and pollution levels of natural waters <sup>are</sup> to be observed.

The cases are studied which are related to the phenomena of isolating the influence of wastewaters of the plants belonging to certain branch of industry on pollution of water objects.

The sanitary protection of water bodies is based on meeting the requirement of limitless usage of reservoirs for drinking water supply, swimming, physical culture, and health purposes. At the same time water bodies have to be preserved as units creating the good microclimate in the townships and playing the positive role for its outer appearance.

Any form of effect on the ordinary regime of a water body, from the sanitary point of view, has the great importance if an infringement of sanitary interests of the population using this water body will occur. The more important these interests the more seriousness has to be shown at evaluating the danger of pollution of the water reservoir.

In our country sanitary protection of water bodies is performed by the bodies of sanitary supervision of the Ministry of Public Health of the USSR and Union Republics, i.e. by the republican and town sanitary epidemiological stations.

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The sanitary epidemiological stations provide the preventive and current sanitary supervision over sanitary protection of the water reservoirs.

The hygienic norms maximum allowable concentrations of harmful substances in the water - developed on the basis of the up-to-date level of development and achievements of medicine have created the basis for optimum designing the installations for purification of city and industrial plant wastewaters and for proper controlling the operation of treatment installations.

Ministry of Fishery, by means of conservation of fishery bodies, provide the supervision over water bodies which are of the importance from the point of view of conservation reproduction and fishing. Research institutes of the Ministry of Fishery develop the maximum allowable concentrations of harmful substances in water bodies which were laid down as a basis of conservation concept in respect to water bodies of this category.

The Ministry of Geology is in charge of management over the application of underground waters, its protection against depletion and pollution. The underground waters conservation bodies give permissions for drilling water wells, for re-equipping wild wells into the operating ones, for constructing and re-equipping other intake structures to be used for application of the underground waters.

The Ministry of Public Health of the USSR and underground resources bodies of the Ministry of Geology provide for the management of the USSR territory

which are related to investigation and application of underground waters. Both Ministries coordinate these works, determine the protective measures against pollution of the underground waters by including them into sanitary protection zones.

3. Research and development investigations in the field of water conservation activity

In the USSR research work in water conservation is carried out in accordance with the unified plan. The participants of this scientific activity are the research, engineering, designing and other institutions.

Implementation of separate assignments of the coordinative plan of water conservation is performed and led by the basic institutes as follows:

The All-Union Research Institute of Water Conservation (Ministry of Reclamation and Water Management of the USSR) is engaged in the following researches:

- development of the basic concepts of combined measures on protection of surface and underground waters against pollution with the wastewaters of all types (including run-off from the territory of townships, industrial enterprises and agricultural lands);
- development of principles of optimization of combined water conservation measures;
- development of methods of management of water quality in water bodies and streams;

- development of scientific bases and norms of designing the structures which can provide for the management of quality of surface and underground waters and water resources protection against pollution, contamination and depletion;
- acquisition, summarization and analysis of the scientific and technical information concerning the problems of water protection against pollution.

The All-Union Research Institute "VODGEO" (State Committee for Construction) is engaged in the following research activity:

- development of theoretical bases of different methods of natural water treatment for water supply to the industrial enterprises; methods of treatment of industrial wastewaters; technological schedules of water desalination; intensification of processes of the water treatment; reuse of treated wastewaters in the production processes and circulating water supply systems;
- development of new highly efficient structures of the treatment installations and improvements of the method of its technological calculation;
- development of principles of automatization of water preparation and wastewaters treatment processes;
- development of norms and standards on designing the complexes of industrial wastewaters treatment.

The Academy of Public Utilities named after Pamfilov (Ministry of Housing and Public Services of the RSFSR) studies the following problems:

- development of the scientific bases of water supply, treatment and disinfection of drinking and wastewaters in cities and small townships of the USSR;
- development of technological schedules, installations, structures to be needed for disinfection of drinking and wastewaters in the cities and small townships of the USSR

The Hydrochemical Institute of Hydrometeorological Service carries out scientific activity in the field of investigations of self-purification processes of water bodies.

VSEGINZEO, Ministry of Geology:

- development of scientific bases on self-purification and protection of underground waters against pollution.

GOSNIORH, Ministry of fish economy of the USSR:

- development of norms and standards of quality of water in water bodies and seas which are of fishery importance.

The Institute of Hydrobiology, Academy of Sciences of the Ukrainian Soviet Socialist Republic:

- investigations of processes of biological pollution of water bodies and streams to develop theoretical basis of methods of improvement of water quality and optimum application of biomass of water plants in the national economy;
- investigations of natural phenomena in formation of hydrobiocenoses and development of methods and concepts of management of its composition and productivity to improve the water quality and increase the yield of valuable bioproducts of fresh water bodies.

The Central Research Station for Agricultural Use of Wastewaters, Ministry of Reclamation and Water Management of the USSR:

- soil after treatment of industrial and domestic wastewaters on the irrigated lands.

The Institute of Biology of Internal Waters, Academy of Sciences of the USSR:

- development of theoretical basis of the circulation of substances and biological processes of self-purification of water bodies.

In accordance with the coordinative plan of research investigations on water conservation problems to be studied within the period from 1971 to 1975 it is planned to study by 1976, the influence of man's economic activity on the water objects and water balance of the river basins. The man's economic activity will be considered including such aspects as agricultural and forest reclamation, irrigation and drainage of lands, mining works and others.

At present the measures directed at preventing the depletion of reserves of the underground waters by means of its artificial water replenishment are developed and measures aimed at management and redistribution of river flows taking into account its protection against pollution and contamination are also under way.

In order to reduce the volumes of water consumed and discharges of wastewaters, the optimum norms of water consumption and apportionment are developed and at the same time the technical requirements on the quality of water consumed in the forty leading branches of industry are also carried out.

Up to 1976 the forecastings and feasibility study reports on optimum production processes in different branches of national economy, on methods of wastewaters treatment and disposal liquidation, on specific capital investments for construction of water treatment installations and cost price of the wastewaters treatment, on water consumption and water apportionment for different water basins of the country will be developed. The new methods and installations for biochemical treatment of the high concentrated wastewaters, processes of local treatment of wastewaters of the coke and chemical production plants, plants producing certain types of drugs, leather and dairy plants, fish processing plants will be also elaborated.

The great program of investigations dealing with development of new methods, technological schedules, structures and installations for treatment <sup>of</sup> city and industrial wastewaters and processing and utilization of deposits has been included in the coordinative plan. At present these investigations are carried out. At the same time the investigations aimed at improvement of existing methods and technological flow sheets of the wastewater treatment processes are also conducted. The program of investigations includes the treatment processes of wastewaters of basic branches of the national economy: chemical, petrochemical, pulp and paper, metallurgical, microbiological, food and other industries. The requirements and regulations on reuse of the wastewaters including its application for irrigation purposes are now developed.

The natural phenomena of formation of surface waters are studied and methods of management and control of the quality of surface waters are elaborated.

In the framework of the coordinative plan it is planned to conduct the following investigations: to develop theoretical bases of processes of substances circulation and biological self-treatment of water bodies; to study natural phenomena of effects of toxical substances on the ecological systems of water bodies; to elaborate measures on preventing pollution of the water bodies by means of run-off of surface and drainage waters discharged from the agricultural lands; to determine maximum allowable concentrations of harmful substances in the water; to carry out mathematical model for forecasting and controlling the processes of formation of water quality; to develop automatic system, instruments and equipment for controlling and management of quality of water sources and others.

As a result of research investigations carried out in the country over the last five years on treatment methods and structures for processing the town and industrial wastewaters and introduction of these investigations into operation of more than 50 plants the total savings to be equal 27 million roubles has been gained.

Over the five years within the 1970-1975 60 water treatment methods and installations are proposed to be introduced.

At present the outlook plan of the research investigations on water conservation concepts over the future 15-20 years is elaborated.

In the USSR the permanent growth of research institutes and its staff to be engaged in the field of water conservation elaborations is very noticeable, however the country is lacking the experts of abovementioned speciality. At present the nomenclature of specialities of the State Committee for Science and

Technology of the Council of Ministers of the USSR includes the speciality on water and air conservation.

Beginning from the State five-year plan of research investigations will have special section "Complex problems of environment conservation activity" containing assignments for solving the most important scientific and technical problems of the environment conservation activity.

The Interdepartmental Scientific and Technical Council of the complex problems on environment conservation is thought to set up under authority of the State Committee for Science and Technology of the Council of Ministers of the USSR.

#### 4. Complex Application of Water Resources in the USSR

The long-term average annual water resources of rivers formed within the territory of the USSR are estimated at 4384 km<sup>3</sup> per year. The average volume of water per one square km of the USSR territory is 196 thous.m<sup>3</sup> or 6.3 l/sec, or 18 thous.m<sup>3</sup>/year per capita.

From the point of view of water application, the distribution of water resources within the territory of the USSR is very unfavourable. Only 14% of the river runoff is distributed on the areas having 85% of the population and 80% of industrial and agricultural enterprises of the USSR.

In the USSR the total sum of forecast, operating resources of the underground waters approximates 220 km<sup>3</sup>, including 184 km<sup>3</sup> of fresh underground waters.

The USSR water management includes the following basic

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branches: water supply to population and industry, agriculture

water reclamation (irrigation, water supply, drainage of bogged areas); internal water transport and rafting; fish economy; hydroenergetics. This policy incorporates water conservation measures, river runoff management, prevention of harmful effects of water, application of water resources for recreation purposes.

The basic principles of development of water management are of primary importance for water supply and complex solution of water conservation problems at carrying out the measures on prevention and liquidation of harmful effects of waters.

It will provide the prerequisites for national application of waters, allow to stimulate development of branches of water economy which are of great importance for the country at the given period of time taking into account the perspectives of development of the national economy as a whole.

The complex and planned usage of water resources gives an opportunity to realize integrated development of the river basins at the lowest expenditures; to optimize and to improve existing water-resources systems; to reduce unproductive water consumption; to increase protection of water objects against pollution by means of improvement of technological processes of production, introduction of circulating and re-use water supply systems, increase of quality of the wastewaters treatment.

The dynamics of growth of total water consumption (water intake) and irretrievable water consumption is shown in Table 1. The figures are given for branches of national economy of the USSR, Approved For Release 2005/04/12 : CIA-RDP79-00798A000800090007-4

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Table 1

Consumers	Water Consumption (km <sup>3</sup> /year)					
	Total			Irretrievable		
	1965	1970	1971	1965	1970	1971
Municipal economy	6.5	12.6	13.1	2.0	2.0	2.1
Industry (including thermoenergetics)	58.2	89.6	92.9	3.0	7.3	8.3
Agriculture including irrigation	104.7	147.7	147.3	83.6	106.2	123.2
Fishery	99.6	130.5	127.8	79.2	94.6	108.2
Evaporation from surfaces of water bodies, ponds and others	7.5	9.2	9.3	1.1	5.1	5.2
	16.7	29.5	29.8	16.7	27.3	27.4
Total	193.6	288.6	292.4	106.4	147.9	166.3

According to forecasting estimation in the near future the total water consumption will increase <sup>1.6</sup> and 2.3-2.5 times in comparing with the arbitrary level of water consumption in 2000.

The task of all possible rationalization of water application in the industry is put and is being now solved with a view to reduce the flow rate of fresh water intake and to prevent discharging the contaminants contained in wastewaters to water objects. For this purpose it is to carry out the following

measures: to complete conversion of water consuming enterprises to the circulating and cooperative water supply systems; to introduce the up-to-date technological processes including the "dry" processes; to limit unproductive losses and leakage of water.

The great growth of reclaimed lands from 21 million hectares in 1972 to 50 million hectares in 1985 which are considered to yield 46-48 million tons of grain up to 10 million tons of raw cotton, 27-29 million tons of vegetables and melons and substantial part of fodder crops, will require not only substantial increase of volume of the water diverted and to be used for irrigation and flooding and implementation of measures on rationalization of water usage for these purposes. Seepage control measures, channel-chutes, pipelines modern methods of irrigation and complex automatization of irrigation systems allow to nationalize substantially the application of irrigation water.

Installed capacity of hydropower stations in the USSR makes up 29 million kw, which is 20 percent of the total power produced by all hydropower stations, while power output is 17 percent, respectively.

Krasnoyarsk power station (6 million kw in capacity), Bratsk power station named after the 50th anniversary of the Great October (4.1 million kw in capacity), Volzhsky power station named after V.I.Lenin (2.3 million kw in capacity) are unique. The reservoirs of the main hydropower stations serve many purposes.

After putting into operation the hydropower stations which are now under construction the installed capacity of the USSR hydropower stations will be 55.9 million kw and power output - 218.5 billion kwhr per year.

The fish reserves of internal water bodies include: the Caspian, Azov, Aral seas, rivers, lakes, reservoirs and ponds. The total volume of fish catch from them is 9-10 million quintals per year.

The general trend in fishery use of the water resources is realization of a number of fish-breeding and reclamation measures in combination with the natural fish reproduction under observation of the main requirements of fishery with due regard to the sanitary conditions of water bodies.

In the USSR a great number of the water-resources complexes meeting the water requirements of population and national-economy enterprises have been constructed for river flow management and its territorial re-distribution. In the USSR by January 1, 1972 one thousand lakes are under operation the capacity averaging 1 million  $m^3$ , the total area of lake surfaces including dammed lakes, is 11.6 million hectares, total storage being 831  $km^3$ , while the useful storage - 406  $km^3$ .

The canals which can be compared with the large rivers with its dimensions and flow rates transferred, have been constructed in the USSR. They are as follows: the canal named after Moscow; Karakum canal named after V.I.Lenin; Irtysh-Karaganda canal, Big Ferghana canal, Nevinnomyesk canal, Belomoro-Baltiisky canal and others. The Big Stavropol,

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Dnieper-Donbas, Severo-Krymsky, Saratov and Volga-Ural canals are now under design and construction.

The ground water supply lines stretching for several thousand kilometers has been constructed in the central area of the Western Siberia and Kazakhstan. They are as follows: Ishimsky, Bulayevsky, Nurinsky, Seletinsky, Presnovsky and others. It can be said that water management has started a new stage of its development, whose peculiarities are:

- interconnection of water problems to be solved within the great territory thus necessitating the establishment of large water-resources systems;
- compulsory consideration of the influence of these systems on the natural conditions of vast territories;
- necessity to consider water problems viewing the far future for it takes much time to design and construct large water resources complexes.

The necessity of optimum system of the water management is predetermined by the following factors: great importance of water economy in the life of the country; complexity of the water resources systems; availability of diverse elements comprising the structures for river flow regulation and redistribution structures for protection of water objects against pollution; supply of water to the consumers; claims, very often conflicting, from separate water users who are the members of the water resources complexes.

For these purposes the functions of the state management of water economy stipulated in the "Basic principles of water

legislation of the USSR and union republics" related to the water resources conservation bodies are authorized by the Ministry of Reclamation and Water Management of the USSR, Union Ministries and other bodies of reclamation and water management.

With the development of water resources different water management enterprises become closely connected with each other:

In this respect the water balance is of great importance. The main aim of this balance is an estimation of availability of surface and underground waters as well as degree of its present and future application and determination of areas having the temporary and permanent shortage of water resources.

In order to determine optimum perspective proportions of water management development in the USSR the general, regional, and basin schedules of combined application and conservation of the water resources are drawn up for various periods of time.

Within the five year period from 1965 to 1970 the development of the General schedule of complex application and conservation of water resources of the USSR has been completed.

In the General schedule the terms of expediency of locating the productive forces in accordance with the water factor, water-resources complexes to be constructed in the first turn and directions of designing and investigating activity and researches in the field of the water economy have been determined for the near 15-20 years.

The basin (regional) schedules of water resources conservation activity to be performed allows to find the most

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favourable solutions of local water problems. The most important schedules from the abovementioned ones are as follows: schedules of the basins of Kuban, Terek, Sulak, Belaya, Ufa, Ural, rivers, basins of Aral and Azov seas and North Caspian basin and others.

In the USSR the General schedule of multipurpose use and conservation of water resources is being now carried out for the far future, 2000.

These schedules will allow to plan more practically the use of resources of surface and underground waters to provide the development of the national economy and meeting the population demands in water. to exclude possibility of formation of gap between the water demands and real possibility of its meeting; to prevent natural water resources from pollution, contamination and depletion.

**BASIC PRINCIPLES  
OF THE WATER LEGISLATION OF THE USSR  
AND UNION REPUBLICS**

**Moscow 1971**

BASIC PRINCIPLES  
OF THE WATER LEGISLATION OF THE  
USSR AND UNION REPUBLICS

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T H E   L A W  
OF THE UNION OF SOVIET SOCIALIST REPUBLICS  
ON THE APPROVEMENT OF THE BASIC PRINCIPLES  
OF THE WATER LEGISLATION OF THE USSR AND  
UNION REPUBLICS

The Supreme Soviet of the Union of Soviet Socialist Republics resolves:

ARTICLE 1. To approve the Basic Principles of the Water Legislation of the USSR and Union Republics and to put it in force beginning on September 1, 1971.

ARTICLE 2. To charge the Presidium of the USSR Supreme Soviet to determine the sequence of implementation of the Basic Principles of the Water Legislation of the USSR and Union Republics and to bring the USSR Legislation to conformity with the Basic Principles.

ARTICLE 3. To charge the Union Republics' Supreme Soviets to bring the Union Republics' legislation to conformity with the Basic Principles of the Water Legislation of the USSR and Union Republics.

N. PODGORNYY  
President,  
Presidium of the Supreme  
Soviet of the USSR

M. GEORGADZE  
Secretary,  
Presidium of the Supreme  
Soviet of the USSR

The Kremlin, Moscow  
December 10, 1970

BASIC PRINCIPLES  
OF THE WATER LEGISLATION OF THE USSR  
AND UNION REPUBLICS

As a result of the victory of the Great October Socialist Revolution the water resources as well as other natural reserves in our country have been nationalised and passed into the possession of the people.

The state ownership of the water resources is the basis of water relations in the USSR, it creates the favourable conditions for realization of the planned and multipurpose utilization of water resources with the greatest efficiency for the national economy and allows to provide for the best conditions for labour, way of life, rest and health protection of the Soviet people.

The development of social production and urbanization, growth of material welfare and cultural level of the people are increasing the versatile water requirements, attaching particular importance to the rational water resources utilization and conservation.

USSR water legislation is aimed at contributing to the most efficient, scientifically-grounded water resources utilization and conservation of water resources and prevention of their depletion.

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SECTION I

GENERAL PROVISIONS

ARTICLE 1. Tasks of the USSR Water Legislation

The tasks of the USSR water legislation are: the regulation of water relations with a view to provide for the rational utilization of the water resources for the needs of the population and national economy; water resources conservation; prevention and elimination of the harmful water effect; improvement of the state of water sources as well as protection of the rights of enterprises, organizations, institutions and citizens; strengthening of the lawfulness in the field of water relations.

ARTICLE 2. Water Legislation of the USSR and Union Republics

The water relations in the USSR are regulated by the present "Basic principles" and other acts of the USSR water legislation issued in accordance with these "Basic principles", water codes and other acts of the water legislation of the Union Republics.

The land, forest and mountain relations are regulated by the appropriate legislation of the USSR and the Union Republics.

ARTICLE 3. State Ownership of Water Resources in the USSR

In accordance with the Constitution of the USSR the wa-

ter resources in the Union of Soviet Socialist Republics are the state property, i.e., the national property.

The water resources are the State monopoly and can be only given for utilization. The actions violating (in direct or latent form) the right of the State property on the water resources are prohibited.

#### ARTICLE 4. State United Water Fund

All the water resources (water bodies) make a State united water fund in the USSR.

The State united water fund comprises:

- 1) rivers, lakes, reservoirs, other surface water bodies and water sources as well as water in canals and ponds;
- 2) ground water and glaciers;
- 3) inland seas and other internal sea waters of the USSR;
- 4) territorial waters (territorial sea) of the USSR.

#### ARTICLE 5. USSR Jurisdiction in the Field of Regulation of Water Relations

The scope of the USSR activity in the field of regulation of the water relations is as follows:

- 1) management of the State united water fund in the ranges necessary for implementation of the USSR powers in conformity with the Constitution of the USSR;
- 2) determination of the basic principles in the field of water resources utilization, their conservation, prevention and elimination of the harmful water effect;
- 3) determination of the allocation rates of water utilization, water quality and methods of water quality evaluation;

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4) determination of united systems of the State account of water resources, their utilization, registration of water uses and State water cadastre within the USSR;

5) approval of schemes of multipurpose water resources utilization and conservation as well as of water budgets having a country-wide importance;

6) planning the all-union measures on water resources utilization and conservation, prevention and elimination of the harmful water effect;

7) State control of utilization and conservation of water resources and establishment of procedures of its implementation;

8) determination of water sources utilization of which is regulated by the USSR authorities.

#### ARTICLE 6. Union Republics' Jurisdiction in the Field of Regulation of Water Relations

The scope of a Union Republics activity in the field of regulation of water relations (which is beyond the scope of the USSR activity) comprises: management of the State united water fund within the republic territory; determination of water resources use procedures, water conservation, prevention and elimination of the harmful water effect; planning the measures on water resources utilization and conservation, prevention and elimination of the harmful water effect; approval of schemes of multipurpose water resources utilization and conservation of water budgets; implementation of the State control of the water resources use and

conservation as well as the regulation of water relations in respect to other matters which are out of the USSR competence.

**ARTICLE 7. State Management in the Field of Water Resources Utilization and Conservation**

The state management in the field of water resources utilization and conservation is directly performed by the Council of Ministers of the USSR, Councils of Ministers of the Union Republics, Councils of Ministers of the Autonomous Republics, Executive Committees of Local Soviets of Workers' Deputies as well as by specially authorized state bodies regulating water resources use and conservation or through basin (territorial) departments and other State bodies in accordance with the USSR and Union Republics' legislation.

**ARTICLE 8. State Control of Water Resources Use and Conservation**

The state control of water resources use and conservation is aimed at providing for the observance by all the Ministries, State, cooperative and public enterprises, organizations, institutions and citizens of the established water resources use procedures; implementation of the duties in respect to water resources conservation, prevention and elimination of the harmful water effect; rules of water account as well as of other rules provided by the water legislation.

The state control of water resources utilization and conservation is accomplished by the Soviets of the Workers' Deputies, their executive and administrative bodies as well

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as by specially authorized State bodies in accordance with the USSR legislation.

**ARTICLE 9. Participation of Public Organizations and  
Citizens in Realization of Measures on Water  
Resources Use and Conservation**

Trade unions, youth organizations, societies of nature preservation, scientific societies and other public organizations as well as citizens assist the State bodies in implementing the measures on the rational water use and conservation.

Public organizations take part in providing for the rational water resources use and conservation in accordance with appropriate regulations and the USSR and Union Republics' legislation.

**ARTICLE 10. Distribution, Planning, Construction and  
Putting into Operation of Enterprises,  
Structures and Other Complexes Affecting  
the Quality of Water**

The rational water use should be provided on condition that priority is given to satisfaction of potable and domestic water requirements of the population while distributing, planning, constructing and putting into operation the new and reconstructed enterprises, structures and other complexes as well as when applying the new technological processes affecting the quality of water. Besides, provision should be made for the measures ensuring the account of water volumes taken from the water sources and returned to them; prevention

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of water pollution and depletion; prevention of the harmful water effect; limitation of flooded areas to a minimum necessary size; prevention of land salinisation, submergence or drying-up as well as preservation of favourable natural conditions and landscapes.

Besides, the measures providing for conservation of fish, aquatic animals and plants and conditions for their reproduction must be timely performed while distributing, planning, constructing and putting into operation the new and reconstructed enterprises, structures and other complexes on fishery ponds.

Selection of sites for construction of enterprises, structures and other complexes affecting the quality of water must be agreed upon with the bodies regulating water use and conservation; Executive Committees of the Local Soviets of Workers' Deputies, with the authorities effecting the State sanitary control, fish-stock conservation and other departments in accordance with the USSR and Union Republics' legislation. Project reports for constructing the enterprises are to be agreed upon with the authorities responsible for regulating the use and conservation of water resources and with other departments in the cases and in the order provided by the USSR legislation.

It is prohibited to put into operation:

- new and reconstructed enterprises, shops, units, communal and other complexes having no facilities preventing pollution of water or its harmful effect;

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- irrigation and water supply systems, reservoirs and canals prior to completion of the measures envisaged by project reports aimed at preventing flooding, submergence, bogging, land salinization and soil erosion;
- drainage systems prior to completion of water intakes and other structures envisaged by the project reports approved;
- diversion structures having no fish-protection facilities as envisaged by the project reports approved;
- hydraulic structures prior to completion of the installations designed to pass flood waters and fish as envisaged by the project reports approved;
- water wells not equipped with water control units and not provided with sanitary zones in appropriate cases;
- filling of reservoirs is prohibited prior to completion of the reservoir bed preparation as envisaged in project reports.

ARTICLE 11. Organization of Construction at Water Bodies  
and Within the Areas Adjacent to Them

Construction, dredging, blasting and mining works, water plant harvesting, laying of cables, pipelines and other communication lines, timber felling; drilling, agricultural and other works at water sources and within the areas adjoining the latter which affect the quality water should be performed on the agreement with the authorities regulating water use and conservation, with Executive Committees of the Local Soviets of the Workers' Deputies and other departments in accordance with the USSR and Union Republics' legislation.

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SECTION II

WATER USE

ARTICLE 12. Water Users

In the USSR water users may be the state, cooperative and public enterprises, organizations, institutions and citizens.

In cases stipulated by the USSR legislation the water-users may be other organizations and persons as well.

ARTICLE 13. Bodies of Water Use

Water bodies listed in Article 4 of the present "Basic Principles" are destined for use.

The use of water bodies of special State significance or of special scientific or cultural value may be partly or entirely prohibited in the order established by the Council of Ministers of the USSR and by Councils of Ministers of the Union Republics.

ARTICLE 14. Forms of Water Use

Water bodies are granted for use on observing the requirements and conditions stipulated by the legislation aimed at meeting the drinking, domestic, medical, health-resort, sanitation and other needs of the population as well as agricultural, industrial, power, transport, fishery and other state and public needs. Utilization of water bodies for disposal of waste water may be permitted only in cases

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and on conditions of observance of special requirements and provisions stipulated by the USSR and Union Republics' legislation.

There are two forms of water use, i.e., general water use and special water use. The former is implemented without the use of structures or technical facilities affecting the quality of water while the latter is performed with the use of such structures and technical facilities. In some cases the use of water bodies not provided with structures or technical facilities but affecting the quality of water may be referred to the special water use.

The list of forms of the special water use is determined by the authorities regulating the water use and conservation.

Water bodies may be under joint or separate use.

Enterprises, organizations and institutions possessing the water bodies on the condition of the separate use, i.e., primary water users, have the right, in the cases stipulated by the USSR and Union Republics' legislation, to allow other enterprises, organizations and institutions the secondary use of these water bodies on the agreement with the authorities regulating the water use and conservation.

#### ARTICLE 15. Order and Conditions of Granting the Water Bodies for Use

Water bodies are granted for use primarily to meet drinking and domestic water needs of the population.

Water bodies are entirely or partly granted for the separate use on the basis of the Act of a Council of Ministers

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of a Union Republic or a Council of Ministers of an Autonomous Republic; on the basis of the decision of an Executive Committee of an appropriate Soviet of Workers' Deputies or the other State authority empowered in the order established by the USSR and Union Republics' legislation.

The special water use is implemented on the basis of the permissions provided by the authorities regulating the use and conservation of water while in cases stipulated by the USSR and Union Republics' legislation, by the Executive Committees of the Local Soviets of Workers' Deputies. Such permissions are provided on the agreement with the authorities administering the State sanitary supervision, fish-stock conservation as well as with other organizations concerned. The order of agreement and provision of permissions for the special water use is established by the Council of Ministers of the USSR.

The general water use is realized without permissions in the order stipulated by the Union Republics' legislation. At water bodies granted for the separate use, the general water use is permitted on conditions specified by primary water user on the agreement with the authorities regulating the water use and conservation, if necessary, this form of water use may be prohibited.

The water use is free of charge. The special water use may be subject to payment in the cases and in the order established by the Council of Ministers of the USSR.

ARTICLE 16. Terms of Water Use

Water bodies are granted for timeless or temporary use.

The permanent use is thought as the use of water resources within the non-predetermined period of time.

The temporary use may be short-term (within three years) and long-term, covering the period from three years to twenty five years. If necessary the length of the water use may be prolonged for the period exceeding short-or long-term temporary periods of water uses, respectively.

The general water use is not limited by a certain period.

ARTICLE 17. Rights and Responsibilities of Water Users

Water users have the right to use water sources (bodies) only for the purposes they are granted for.

In the cases stipulated by the USSR and Union Republics' legislation the rights of water users may be restricted viewing the State interests as well as those of other water users. In this case the conditions of use of water bodies in respect to satisfaction of potable and domestic water needs of the population must not be deteriorated.

Water users are obliged:

- to rationally use water sources to take care of economic water use, to restore and improve the water quality;
- to eliminate the spilling of waste waters containing pollutants to water sources;

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-to prevent violation of the rights given to other water users as well as not to damage the economic projects and nature (lands, forests, wildlife, minerals and others);  
-to maintain in good state water treatment and other hydraulic structures and technical facilities affecting the quality of water; to improve their operational characteristics and in the stipulated cases to measure the water volumes used.

ARTICLE 18. Reasons for Stopping Water Use Rights

The right of enterprises, organizations, institutions and citizens for the use of water sources may be ceased in the following cases:

- 1) vanishing of the need in the water use or refusal from it;
- 2) expiration of time for the water use;
- 3) liquidation of an enterprise, organization or institution;
- 4) passing of hydraulic structures to other water users;
- 5) arising the necessity to eliminate water sources from the separate water use.

The right of enterprises, organizations, institutions and citizens to use water sources (except the right to use water sources for potable and domestic water needs) may be also ceased in the case of violation of the rules of the water use and conservation or use of a water source for the purpose other than it is granted for.

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The Union Republics' legislation may envisage the other reasons for stopping the water use right of enterprises, organizations, institutions and citizens.

ARTICLE 19. Order of Stopping the Right of Water Use

The right of water use is ceased:

- by cancelling the permission on the special as well as secondary water use;
- by withdrawing water sources granted for the separate use.

Cessation of special water use is implemented by the decision of an authority that granted the permission for it.

The secondary water use may be ceased by the decision of a primary water user on the agreement with an authority regulating the water use and conservation.

The withdrawal of water sources from the separate use is performed in the order stipulated by the USSR and Union Republics' legislation.

The withdrawal of water sources from the separate use of enterprises, organizations and institutions of Union subordination should be performed on the agreement with water users, ministries and departments to which they affiliate.

ARTICLE 20. Reimbursement of the Damage Caused by Implementation of Water Developments, Cessation or Alternation of Water Use Conditions

The damage caused to enterprises, organizations, institutions and citizens as a result of water developments (hydraulic construction, etc.) as well as by cessation or alternation

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of conditions of the water use are to be reimbursed in cases and in the order established by the Council of Ministers of the USSR.

**ARTICLE 21. Use of Water Bodies for Potable, Domestic and Other Water Needs of the Population**

Water bodies (sources) whose quality of water meets the established sanitary requirements are granted for potable and domestic water supply as well as for other needs of the population.

The use of ground water having the quality peculiar for potable water for the purposes other than potable and domestic water supply is, as a rule, prohibited. However, in the areas lacking the necessary surface water sources but having sufficient reserves of ground water of the potable quality, the authorities regulating the water use and conservation may allow the use of this water for the purposes other than potable and domestic water supply.

**ARTICLE 22. Use of the Water Sources for Medical, Health-Resort and Health-Promoting Purposes**

Water sources referred in the established order to a group of medical sources are mainly used for medical and health-resort purposes. In exceptional cases the authorities regulating the water use and conservation may allow the use of water sources, referred to the medical group, for other purposes on the agreement with appropriate health and health-resort departments.

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Disposal of waste water to water sources referred to the medical group is prohibited.

The order of use of water sources for rest and sports is stipulated by the USSR and Union Republics' legislation.

**ARTICLE 23. Use of Water Sources for Agricultural Needs**

The use of water sources for agricultural needs is carried out in both forms, general and special water uses.

In the case of special water use application is made of irrigation, water supply, drainage and other hydraulic structures and facilities belonging to State organizations, collective and state farms and other water users.

Collective and state farms as well as other enterprises, organizations, institutions and citizens using water sources for agricultural purposes must follow the established plans, regulations, rates and regimes of the water use; take measures to reduce seepage and evaporation losses within reclamation systems; prevent non-productive water spilling from these systems, prevent the fish entry to reclamation systems from fishery ponds as well as create the most favourable soil moisture regime.

Irrigation of agricultural lands with waste water may be allowed by the authorities regulating water use and conservation on the agreement with the departments implementing State sanitary and veterinary supervision.

The provisions of the present Article are valid as well for irrigation and drainage of lands under forests, forest strips and forest nurseries.

**ARTICLE 24. Use of Water Sources for Industrial Purposes**

Water users using water source for the industrial purposes must follow the established plans, technological rates and regulations of water use as well as take measures to reduce water consumption and stop waste water spilling by improving the water supply technology and layouts (application of waterless technological processes, air cooling, circular water systems and other means).

Executive Committees of the Local Soviets of Workers' Deputies in cases of natural calamity, failures and under other exceptional circumstances as well as in cases of overconsumption of water shares taken from a water-supply system by an enterprise have the right to reduce or prohibit the consumption of potable water for industrial purposes from public water-supply systems and to temporarily limit the water consumption from departmental domestic-water-supply systems aiming, primarily, at meeting the potable and domestic water needs of the population.

Ground water (fresh, mineral, thermal) not referred to potable or medical water categories may be used in the established order for technical water supply, extraction of chemical elements, generation of thermal power and other industrial needs viewing the requirements of the rational water use and conservation.

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**ARTICLE 25. Use of Water Sources for the Needs of  
Hydropower Generation**

Use of water sources for hydropower supply is implemented with due regard for the interests of other branches of the national economy as well as with the observance of the requirements of the multipurpose use of water if other uses of water sources are not directly stipulated by the act of the Council of Ministers of the USSR or acts of Councils of Ministers of the Union Republics and in the stipulated cases - by a decision of an authority regulating the water use and conservation.

**ARTICLE 26. Use of Water Sources for the Needs of  
Water Transport and Timber-Rafting**

Rivers, lakes, reservoirs, canals, inland seas and other internal sea waters of the USSR as well as territorial waters (territorial sea) of the USSR are the waterways that are in the general use except for the cases when their use for the above purposes is completely or partly prohibited or these water sources are granted for the separate use.

The order of classification of waterways as shipping or timber-rafting categories as well as the formulation of the regulations for waterways operation is stipulated by the USSR and Union Republics' legislation.

Log-floating as well as timber-drifting in bunches and pieces without towship is prohibited:

- 1) on waterways;

2) on water bodies the list of which is approved by the Council of Ministers of the USSR or Councils of Ministers of the Union Republics with due regard for the peculiar significance of these sources for fishery, water supply or other national-economic purposes.

As for the rest of the water sources the above types of timber-floating are allowed with permission provided by the authorities regulating the water use and conservation on the agreement with the departments realizing fish-stock conservation.

Timber-driving organisations are obliged to regularly clean the rafting ways from the logs drown.

ARTICLE 27. Use of Water Sources for the Needs of Air  
Transport

The order of use of water sources for parking, take-off and landing of air ships as well as for other needs of air transport is stipulated by the USSR legislation.

ARTICLE 28. Use of Water Sources for the Needs of  
Fishery

On fishery ponds or their separate sections of special importance for conservation and reproduction of valuable fish species, aquatic animals and plants, the rights of water users may be restricted viewing the interests of fishery. Lists of such water bodies or their sections as well as the types of water use limitations are determined by the authorities regulating the water use and conservation, these ma-

terials being submitted by the authorities responsible for fish-stock conservation.

When operating hydraulic and other structures at fishery water bodies timely measures envisaging fish reserves conservation and fish reproduction should be provided for.

The order of the use of water sources for the needs of fishery is stipulated by the USSR and Union Republics' legislation.

ARTICLE 29. Use of Water Sources for the Needs of Hunting

Authorities responsible for the water use and conservation can give the rights of use of rivers, reservoirs and other water sources, the habitats of water fowl and valuable aquatic fur-bearing animals (beavers, muskrat, minks, coypu rats and others) to hunting enterprises and organizations regarding the requirements of multipurpose water utilization.

The order of use of water sources for the needs of hunting is stipulated by the USSR and Union Republics' legislation.

ARTICLE 30. Use of Water Sources for the Nature Preservation Purposes

Water sources which are of special scientific or cultural value are claimed as stipulated by the USSR and Union Republics' legislation reservations and are granted for the time-less separate use to reservation authorities aiming at nature preservation and carrying-out the research works.

The order of water use in reservations is stipulated by the reservation regulations.

The withdrawal of water sources from the use of reservations is allowed only in cases of emergency as stipulated by the act of a Council of Ministers of a Union Republic.

ARTICLE 31. Use of Water Sources for Disposal of Waste Water

Use of water sources for disposal of industrial, domestic and public, drainage and other waste water may be allowed only by the permission of the authorities regulating the water use and conservation on the agreement with the authorities administering the State sanitary supervision, fish-stock conservation and with other organizations concerned.

The waste water disposal may be allowed only in cases this action does not result in the increase of pollutants content in water sources over the approved rates to the extent allowed by the authorities regulating the water use and conservation.

If the above requirements are violated the waste water disposal should be restricted, stopped or prohibited by the authorities regulating the water use and conservation up to the cessation of the operation of separate industrial plants, shops, enterprises, organizations, institutions. If the public health is threatened the authorities administering the State sanitary supervision have the right to stop the waste water disposal up to the cessation of operation industrial and other projects informing the authorities responsible for the water use and conservation.

The order and conditions of use of water sources for the waste water disposal are established by the USSR and Union Republics' legislation.

ARTICLE 32. Use of Water Sources for Fire-Prevention  
and Other State and Public Needs

Taking of water for the fire-prevention purposes is allowed from any water sources.

The order of water sources use for fire-prevention purposes as well as for other State and public needs is established by the USSR and Union Republics' legislation.

ARTICLE 33. Operation of Reservoirs

Enterprises, organisations, and institutions operating dams, water-discharging and diversion structures on reservoirs are to follow the reservoir filling and drawdown schedules established with regard to the interests of water-and land users within the zones of reservoir command.

The order of reservoir operation is determined by the rules approved by the authorities responsible for water utilisation and conservation viewing every reservoir, cascade or system of reservoirs on the agreement with the authorities administering the State sanitary supervision, fish-stock conservation and with other organisations concerned.

Organisations and coordination of measures providing for appropriate technical and aesthetic conditions of reservoirs as well as control over the observance of operational rules are performed by the authorities responsible for the water use and conservation in the order established by the Council

of Ministers of the USSR or Councils of Ministers of the Union Republics.

The provisions of the present Article are applied to the operation of lakes and other water sources used as reservoirs.

**ARTICLE 34. Control Over the Use of Water Sources Found within the Territory of Several Union Republics**

The control over the use of water sources located within the territory of two or several Union Republics affecting the interests of these republics is implemented in agreement among authorities of the republics concerned except those water sources the use of which is in the competence of the USSR.

**ARTICLE 35. Order of Settling the Disputes on Water Sources Use**

The disputes on water utilization are settled by Councils of Ministers of the Union Republics, Councils of Ministers of Autonomous Republics, Executive Committees of Local Soviets of the Workers' Deputies as well as the authorities regulating utilization and conservation of water resources and other State authorities empowered in the order established by the USSR and Union Republics' legislation.

The disputes between water users of one Union Republic and water users of the other Union Republic on the water use are considered by a commission formed on a par with the representatives of the Union Republics concerned.

If the commission has not reached an agreement the dis-

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putes on the above problems are to be considered in the order determined by the Council of Ministers of the USSR.

Property disputes concerning the water relations are settled in the order established by the USSR and Union Republics' legislation.

ARTICLE 36. Water Management on International Waters  
of the USSR

Water management on the international waters of the USSR is based on international agreements.

In the extent that the water management in the Soviet part of the international waters is not settled by international agreements with the participation of the USSR, it is administered in conformity with the USSR and Union Republics' legislation.

The order of water management on the international waters of the USSR is established by the competent authorities in agreement with the Command-in-Chief of the frontier troops.

SECTION III

WATER CONSERVATION AND PREVENTION OF HARMFUL  
WATER EFFECTS

ARTICLE 37. Water Conservation

All the waters (water bodies) are to be conserved with the aim to prevent pollution and depletion which may damage public health as well as entail the decrease of the fish-stock, deteriorate the conditions of water supply and cause other unfavourable phenomena as a result of changes of physical,

chemical, biological properties of water, deterioration of the water natural self-cleaning capability, violation of the hydrological and hydrogeological water regime.

Enterprises, organizations and institutions whose activity affects the quality of waters are obliged to perform technological, forest reclamation, agricultural, hydrotechnical, sanitary and other measures aimed at prevention of water pollution and depletion as well as improvement of the water quality and regime. The above measures should be agreed upon with the authorities regulating the water use and conservation, Executive Committees of the Soviets of the Workers' Deputies, departments responsible for the State sanitary supervision, fish-stock conservation and with other State authorities concerned or by orders of the State measures must be performed under the instructions of the state departments authorized.

Water conservation measures are envisaged in the State plans of the national economy development.

#### ARTICLE 38. Prevention of Water Pollution

The disposal of industrial, domestic and other wastes to water sources is prohibited. The discharge of waste water is allowed on condition the requirements stipulated in Article 31 of the present "Basic Principles" are observed.

The owners of water transport means, pipelines, floating and other facilities on water sources, timber-rafting organizations as well as other enterprises, organizations and institutions should prevent any kind of water pollution as a result of the escape of oils, timber, chemical, petro-

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1980 and other products.

Enterprises, organisations and institutions should prevent pollution of surfaces of catchments and glaciers, of the ice-cover of water sources with industrial, domestic and other wastes as well as with petroleum and chemical products washing out of which can entail the deterioration of the quality of surface and ground waters.

Administrations of State water development systems, collective and state farms as well as other enterprises, organisations and institutions are obliged to prevent water pollution with fertilizers and chemical weed and pest killers.

With a view to conserve the waters used for potable and domestic water supply, medical, curing, health-resort and health-promoting needs of the population sanitary districts and zones under sanitary supervision are established in conformity with the USSR and Union Republics' legislation.

#### ARTICLE 39. Water Depletion Prevention

To maintain the favourable water regime in rivers, lakes, reservoirs, of ground waters and in other water sources, to prevent water erosion of soils, reservoir silting, deterioration of habitat conditions of aquatic animals, to reduce flow fluctuations, etc., provision is made for establishing forest water conservation zones and carrying-out forest-reclamation, erosion-prevention, hydrotechnical and other measures in the order stipulated by the USSR and Union Republics' legislation.

While coordinating the problems of distribution and construction of enterprises, structures and other complexes affecting the quality of waters as well as while giving permissions on the special water use the authorities regulating the water use and conservation should follow the schemes of multipurpose water utilization and conservation as well as water budgets accounting for the interests of water and land users.

If aquifers were tapped while drilling and mining connected with searching, exploration and exploitation of gas, oil, coal and other mineral deposits the organizations responsible for these works should immediately contact the authorities regulating the water use and conservation and take appropriate measures on ground water conservation.

Artesian wells are to be equipped with control devices, to be temporarily closed or liquidated in the order established by the USSR and Union Republics' legislation.

**ARTICLE 40. Prevention and Elimination of Harmful  
Water Effects**

Enterprises, organizations and institutions are obliged to take measures agreed upon with the authorities regulating the water use and conservation, Executive Committees of the Local Soviets of Workers' Deputies and other State departments concerned or by the instructions of the departments empowered for prevention and elimination of the harmful water effects:

Inundations and floodings;

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- destructions of banks, levees and other structures;
- land bogging and salinization;
- soil erosion, formation of gullies, landslides, and streams and other harmful events.

Implementation of urgent measures on prevention and elimination of natural calamities caused by harmful water effects regulated by the USSR and Union Republics' legislation.

The measures on prevention and elimination of the harmful water effect are envisaged in the State plans of the national economy development.

#### SECTION IV

##### STATE EVALUATION, REGISTRATION AND PLANNING OF WATER RESOURCES

###### ARTICLE 41. Tasks of the State Water Resources Evaluation, Registration and Planning

State water resources evaluation, registration and planning are aimed at determination of the quantity and quality of waters, the data on water utilization for the needs of the population and of the national economy.

Water resources planning should provide for the scientifically-grounded distribution of water among water users viewing the immediate satisfaction of potable and domestic water needs of the population, water conservation and prevention of the harmful water effect.

While water resources planning the account should be made of the data of the State water cadastre, water budgets, schemes of multipurpose water resources use and conservation.

ARTICLE 42. State Water Cadastre

The state water cadastre includes the data of the water resources inventory viewing the quantitative and qualitative factors; registration of water uses as well as the data on the water volumes used.

ARTICLE 43. Water Budgets

The water budgets estimating the availability and the extent of water utilization are drawn up for the basins, economic regions, Union Republics and the USSR.

ARTICLE 44. Schemes of Multipurpose Utilization and Conservation of Water Resources

The general and basin (territorial) schemes of multipurpose water use and conservation determine the basic water and other developments to be performed with regard for meeting the prospective water needs of the population and of the national economy, as well as for water conservation and prevention of harmful water effects.

ARTICLE 45. Order of the State Water Resources Evaluation, Registration and Planning, Keeping of the State Water Cadastre, Drawing Up of Water Budgets and the Development of Schemes of Multipurpose Use of Water Resources and Their Conservation

The State water resources evaluation, registration, utilization and keeping of the state water cadastre, drawing up

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of water budgets and the development of schemes of the multipurpose utilization and conservation of water resources are implemented at the State's expense and by the patterns common for the USSR.

The order of the State water resources evaluation, registration and utilization, keeping of the State water cadastre, drawing up of water budgets, of the development and approval of the schemes of multipurpose water use and conservation is established by the Council of Ministers of the USSR.

#### SECTION V

##### RESPONSIBILITY FOR VIOLATING THE WATER LEGISLATION

##### ARTICLE 15. Responsibility for Violating the Water Legislation

Handing over the right of the water use from one water user to the other and other bargain arranged in a direct or latent form violating the right of the State ownership of the water resources are not valid.

The people guilty in arranging the above bargains and similar actions listed below:

- unlawful capture of water sources or unwarranted water use;
- water diversion violating the water use plans;
- water pollution;
- putting into operation the enterprises, public and other

projects not provided with facilities preventing water pollution or harmful water effects;

- careless and wasteful use of water, drawn or diverted from water sources;

- violation of the water conservation regime within the catchments resulting in water pollution, water erosion of soils and other harmful effects;

- unwarranted implementation of hydrotechnical works;

- damaging of hydraulic structures and units;

- violation of instructions for operation of hydraulic structures and facilities -

bear the criminal and administrative responsibility in conformity with the USSR and Union Republics' legislation.

Responsibility for other kinds of violation of the water legislation may be established by the Union Republics' legislation.

Unwarrantedly captured water sources are returned to a proper water user without reimbursing the damages occurred within the period of illegal water sources use.

The enterprises, organizations, institutions and citizens are to reimburse the damages caused by the violation of the water legislation. The sum of reimbursement and the order of its implementation are established by the USSR and Union Republics' legislation. Officials and other workers by whose fault the enterprises, organizations, institutions and citizens paid the expenses to reimburse the damages should bear the pecuniary responsibility in the order established.

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Tab E

Summary of Working Group and Sub-Group Discussions

March 20, 1973

I. PLENARY SESSION

Deputy Minister Shtepa opened the meeting of the Working Groups and in brief introductory remarks welcomed the group, indicated how important he considered the talks, pointed out similar problems, industry, resources and capabilities in the two countries and the value of sharing knowledge and experience on pollution control and resource protection matters. Despite the differences between the two countries, he thought cooperation would benefit both nations and other nations too.

Dr. Buckley noted the similarity between The Deputy Minister's approach and our own and outlined common interests and objectives for the U. S. and USSR in water pollution control cooperation. He suggested several changes in the agenda, namely each country to make a resume of its pollution control organization and activities and to break working sessions into working groups rather than plenary sessions the full time.

M. Shtepa accepted these changes and later provided a previously prepared paper describing Soviet Water Control programs and legislation.

Dr. Buckley, Mr. Strelow and Mr. Pisano described U.S. Government water pollution activities and organization including relationships with the States.

Topic I - Studies and modelling of river basin pollution:

Mr. V. R. Lozansky of the All-Union Scientific Research Institute on Water Protection (VNIIVO) spoke to the first topic to indicate why the USSR wanted to use the Seversky Donets River in the project.

The Seversky Donets River is in the north eastern Ukraine. It is the largest tributary of the Don River and runs through Zmiyev and Kharkov where there is a water research laboratory. The region has a high population density, considerable industry; the river is the main water supply source in the area. Some 1,053 kilometers long, it ranges from 40-60 meters wide and in its lower reaches is 60-100 meters with an average discharge of 110 cu/meters/sec. Its geological basin has calcareous sediments and in the lower areas is coal. Calcium is in the ground water and minerals. In the upper reaches of the river water quality is satisfactory; in the middle industry is active and water quality is poor. Major steps are now being taken to enhance the water quality.

-2-

In the 100 km central area, there are a number of major pollution sources. This will be the site of joint study, near Kharkov. This area has 5 large chemical enterprises. Two of the five produce soda. Flourides, phenols, heavy metals and other substances pour into the river, also mine water, treated sewage with suspended substances, minerals and dissolved organic substances. This 100 kilometer stretch has great importance for the neighboring industrial areas and there is a good opportunity and a reason for employing automated systems of control and water quality monitoring.

The Soviets would like to become acquainted with U.S. instrumentation for measuring water quality in rivers, in mathematical models for forecasting quality and regulation.

Dr. F. Ya. Rovinsky of the Institute of Applied Geophysics spoke on the Moskva River. This river is in the central part of European Russia on the East European plain. Forestry constitutes 30 percent of the lower part of river use. Soils are sandy and loamy. The river is 502 km. long; its basin covers 17,000 square km.; its level drops 155 meters from the source to the mouth. At its lower reaches it is 170 m wide and 3 m deep. The average discharge is 60 cu/m/sec. Water comes mainly from surface runoff, from the Moscow canal linking it with the Volga River and the River Yowser.

Dams and water impoundments regulate the flow. There are five dams during navigational season. In the Moscow area, there are large industrial inputs and surface runoff, much of which are treated. Last year the Moscow treatment plant handled 4 million cu./meters/day of effluent. The amount of industrial and municipal wastes are 50-50. When it leaves Moscow, it is moderately contaminated with phenols and metals above allowable levels. Many studies were needed of source and control measures.

Mr. Pisano commented on the two Soviet presentation indicating the principal U.S. interest was in developing information for use in ascertaining a regulatory approach to the pollution problem. The purpose of the river basin plan was to develop a control strategy that could be used. Technical analysis was valuable principally as it helped the decision maker. We are interested in studies but also in exchanges of information on analytical tools of planning and control.

#### Topic II - Protection and Management of Lakes:

Mr. Joseph led off by describing the different kinds of pollution problems of each of the five Great Lakes, the nature of the scientific knowledge about each lake and the organizations and facilities

-3-

Engaged in pollution related studies. He pointed out that on the basis of its pristine character Lake Superior is perhaps the closest to Lake Baikal. In terms of pollution sources Lake Erie is the most complex and most difficult to understand effects and provide for pollution control. He also touched on the alpine nature of Lake Tahoe and the land developments around it, which make it similar to Lake Baikal and its pollution problems. Mr. Joseph expressed enthusiasm for exchanging information on scientific studies of lake processes.

Professor Zenin of the USSR Institute of Hydrochemistry discussed Lake Baikal and its pollution sources - the paper mill at Baikalsk and industry along the Selenga River. He then indicated the desire for the proposed series of visits and information exchanges as outlined in the Agreement subject Area II. He said the USSR was interested in: fate and transformation of chemical substances, mixing and diluting processes, methods of studying processes of self-purification, and the possible basis for automated monitoring to detect and measure substances.

#### Topic III - Effects and Standards

Dr. Mount opened the discussion by describing the activities of the Duluth Laboratory, its toxicology studies, and special studies on taconite tailings in Lake Superior. He saw value in information exchange and cooperative work on permissible concentrations, on the philosophical approach to such concentrations and on the effects of pollutants. He mentioned in particular Soviet experience in determining suitability of water for swimming, and an interest in having Soviet scientists work in U.S. Laboratories.

Professor Vinberg discussed somewhat obscurely Soviet interests and outlined a proposed program for the subject area.

#### Topic IV - Treatment of Waste Discharges

Professor S. V. Yakovlev outlined Soviet interest in the fourth project area, in particular in improved methods for dealing with pulp and paper, closed cycle oil refineries, nutrient removal, sedimentation and the like as described in the final project paper.

Mr. Johnson replied citing the recent goals and requirements of U.S. legislation. He noted in particular U.S. interest in disposal of industrial waste and municipal residues, especially land disposal of sludge, voicing interest in toxic and other non-biodegradable substances; such as heavy metals and PCBs. He called attention to new pressures for disposal on land resulting from limitations on ocean dumping and invited broad cooperation in all these areas.

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A. Studies and Modeling of  
River Basin Pollution

During the discussions on this subject area the Soviet experts expressed interest in developments in U.S. analysis and modeling techniques. Mr. Lozansky stated that the Soviet Union was working toward automated data collection with an on-line modeling for developing decision roles which could be applied daily in factories and municipalities. They were seeking to achieve an automated control system to minimize pollution and maximize their control system.

Dr. Rovinsky was most interested in developing a biological model that could be employed to predict ecological damage from pollution and used as a basis for decision making.

The U.S. side was interested in determining what stage the Soviets were in developing and applying models and planning methodology. From the discussions it appeared that the U.S. was ahead in these fields and that there was not so much to be gained there. It was evident, though, that the Soviets approached matters in these fields differently from the U.S. and that their approach merited investigation. The Soviets, for example, appeared to have fewer constraints on their actions. Institutionally, for instance, the government appeared free to move quicker to implement decisions once they were made. They could manage river basins more effectively; they had fewer legal restraints on use of assimilative capacity, could use in-stream aeration, flow regulation and the like.

Thus a study of how the different systems and laws approached the solution of the various pollution problems in river basins along the lines of that outlined in the agreed program appeared to be most useful.

-5-

B. Protection and Management of Lakes and Estuaries

The USSR proposed a series of visits and exchanges similar to those EPA proposed in December 1972. Most of the sub-group discussions centered on defining the terms used in the program and in better understanding the pollution problems and interests of each side.

Some subtleties occur in the USSR draft regarding topics to be covered in the exchanges. These involve their use of the terms "estuaries", "eutrophication" and "hydrobiological conditions" vis a vis pollution.

The group under Director Zenin is largely oriented to the physics and chemistry of the Lake Baikal system. No biological effects data relating to a cause and effect are being collected other than those which may be inferred from a time series of biological surveys. This will probably be an obstacle in discussing or determining water quality criteria for Lake Baikal.

The Soviet use of "eutrophication" is with reference to the influences of "biogenic" (Nutrients) substances. The U.S. expert was not able to learn from the Soviet physical scientists whether or not they are doing algal assays or nutrient cycling studies on Lake Baikal.

The Soviets included "estuaries" in the schedule of topics, not because they have estuary pollution problems, but because they are aware of the U.S. Modeling efforts on estuaries. They expressed a strong interest in U.S. mathematical models. The U.S. side agreed to discuss the inclusion of estuaries in this information exchange at greater length at the time of the site visit to Baikal in August 1973. The inclusion of estuaries in the program is only tentative at present.

Zenin inferred a quid-pro-quo on the exchange visits. The Soviets will include six experts when they visit the U.S. in September 1974 and would like the U.S. to send six people on the visit to Lake Baikal in August 1973. It was agreed that these numbers were approximate and not binding. Visit lengths of 14 days were agreed upon. The Soviets will send a detailed daily agenda for the Lake Baikal visit 60 days in advance and expect similar information before their visit.

The possible symposium for the third quarter of 1975, listed at Section D-2 of the program is to be tied to the mathematical modeling symposium proposed (I-1.2) under the River Basins project. Here Zenin's group is thinking more about a bilateral exchange or workshop than a multilateral conference; some 100 participants would be expected.

-6-

The initial reference to "Lake Michigan" in the exchange of site visits was changed to "one of the Great Lakes". None of the five Great Lakes is exactly analogous to Lake Baikal either in characteristics or pollution problems. Since the Soviet interest is in mathematical modeling and in automated monitoring, it perhaps would be best to review and discuss these aspects in terms of several of the lakes.

It is not now clear why the Soviets want U.S. specialists to study the work of the treatment facilities of the Baikal pulp and paper plant. But U.S. participants gained the impression that some differences between responsible Soviet ministries could be at the source of this interest.

C. Effects and Standards

During the discussions on effects and standards, the Soviets presented a paper containing points similar to those earlier outlined by the U.S. side. The chief Soviet interest appeared to be a symposium in 1974 on the problem of pollutant effects on ecosystems. Dr. Vinberg of the USSR is interested in U.S. experience with mathematical models and wishes to learn what the U.S. is doing in this field. He wants in particular to meet with U.S. experts.

The discussions suggest that the Soviet experts know what they should be doing but aren't yet doing it. They are not ready for us to see their work and would like first to see ours.

The U.S. side sees the possibility of acquiring some of the Soviet literature on particular topics of interest, such as phenols and effects on aquatic life. Also Soviet experience in the effects of low dissolved oxygen may be valuable and should be pursued.

D. Prevention or Treatment of Waste Discharges

The Soviets offered a program including the exchange of information and technical experts' visits between 1973 and 1977, covering the following program items, under "Prevention or Treatment of Waste Discharges."

1. Improvement of Water Supply recycling for pulp and paper plants using domestic and industrial wastewaters;
2. Improvement of existing and development of new and highly effective wastewater treatment plants;
3. Improvement of wastewater treatment processes for oil refineries with an aim of maximum water recycling; and

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4. Treatment and disposal of wastewater residues. Various basic area sub-sections were included in the Soviet proposal.

The US side agreed with the proposed program items for cooperation with the following additions:

1. A new sub-section was included with the fourth item (Treatment and Disposal of Waste Water Sediments), as follows:

"4.4 Application of sludge to the land and its use for agriculture and land reclamation."

2. The second and fourth item titles were expanded to include the phrase "Domestic and Industrial" as applied to wastewater treatment plants in the second item and wastewater residues in the fourth item.

The US side proposed to conduct a joint exhibition, or fair, of treatment processes and equipment; this proposal was taken under advisement by the USSR delegation.

The final program as adopted is contained in the signed Record of Discussion.

RECORD OF DISCUSSIONS

at the First Session of the US-USSR Joint Working Group  
on Cooperation in the Field of Water  
Pollution Prevention

I.

In accordance with the US-USSR Agreement on Cooperation in the Field of Environmental Protection signed in Moscow on May 23, 1972 and the Memorandum of Implementation of the above Agreement signed in Moscow on September 21, 1972, the first Session of the US-USSR Joint Working Group on cooperation in the field of water pollution prevention was held in Moscow, March 20-23, 1973.

The US delegation was headed by Dr. John Buckley, Deputy Director, Office of Research, Environmental Protection Agency. The USSR delegation was headed by B.G. Shtepa, Deputy Minister, the USSR Ministry for Reclamation and Water Management.

The list of participants to the Session is attached (Appendix 1).

II.

1: In the course of the discussions both sides exchanged information and views on the water pollution prevention programs and activities being conducted in each country, defined projects of mutual interest and discussed procedures for cooperation.

2: The delegations discussed and agreed upon the program of cooperation on the four Projects outlined below and elaborated in Appendix 2 of the present document:

- Studies and modelling of river basin pollution.

- 2 -

- Protection and management of lakes and estuaries.
- Effects of pollutants upon aquatic ecological systems and permissible levels of pollution.
- Prevention or treatment of waste discharges.

3. At the Session the Working Group discussed and agreed upon the terms and programs of visits in 1973-1974 of US specialists to the USSR project sites, including the Seversky Donets and Moskva Rivers and Lake Baikal, and of Soviet specialists to the US project sites, such as the Delaware and Ohio Rivers and the Great Lakes and Lake Tahoe or other (Appendix 3).

4. The delegations agreed that the detailed programs of visits of the US and Soviet specialists should be coordinated by the sides not later than two months prior to the starting date of a visit.

5. The delegations agreed that any information received in the course of cooperation would be published upon mutual agreement.

6. Any problems or other questions that may arise in the process of cooperation will be resolved through correspondence between the respective Chairmen of the Working Group or officials authorized or at regular sessions of the Working Group.

7. The second session of the US-USSR Joint Working Group on water pollution prevention is planned to be held in Washington, D.C., during the IIInd quarter of 1974.

### III.

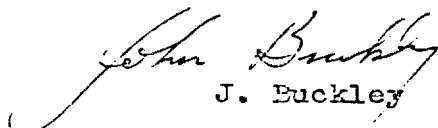
Both delegations express their satisfaction that the first Session of the US-USSR Joint Working Group on water pollution prevention was held in an atmosphere of friendship and mutual

- 3 -

understanding contributing to further development of cooperation between the two sides.

During the stay of the US specialists in Moscow they had an opportunity to visit the Moskva-Oka Basin Inspection, waste water treatment facilities of the Novo-Kuriyanovo Aeration Station and the Likhachev Automobile Plant.

The present Record of Discussions was signed in Moscow on March 23, 1973, in two copies, Russian and English, both copies being equally valid.

  
J. Buckley

Chairman of the US Section  
of the Joint Working Group



B.G. Shtepa  
Chairman of the USSR Section  
of the Joint Working Group

Appendix 1

DISP

of the Participants at the First Session  
of the US-USSR Joint Working Group on  
Water Pollution Prevention

US Side

Dr. John Buckley	- Deputy Director, Office of Research, Environmental Protection Agency, Chairman of the US Section
Mr. Mark Pisano	- Acting Director, Water Planning Division, Environmental Protection Agency, Member of the Working Group
Mr. Arnold Joseph	- Chief, Fate of Pollutants Studies, Environmental Protection Agency, Member of the Working Group
Dr. Donald I. Mount	- Director, National Water Quality Laboratory, Environmental Protection Agency, Member of the Working Group
Mr. Kenneth Johnson	- Deputy Director, Division of Municipal Waste Water Systems, Environmental Protection Agency, Member of the Working Group
Mr. William H. Mansfield	- Director of Bilateral Programs
Mr. Roger Strelow	- Senior Staff Member, Council on Environmental Quality

USSR Side

Shtepa B.G.	- Deputy Minister for Reclamation and Water Management, Chairman of the Soviet Section
Lozansky V.R.	- Director of the All-Union Scientific Research Institute on Water Protection (VNIIVO), The USSR Ministry for Reclamation and Water Management, Deputy Chairman
Zenin A.A.	- Director, Institute of Hydrochemist Hydrometeorological Service of the USSR, Deputy Chairman
Vinberg G.G.	- President of Hydrobiological Society, Institute of Zoology, USSR Academy of Sciences, Member of the Working Group

- 2 -

Yakovlev S.V.

- Director, All-Union Research Institute for Water Supply, Sewage, Hydraulic Structures and Engineering Hydrogeology (VODGEO), USSR Gosstroï, Member of the Working Group

Filippov V.I.

- Director, Moscow Scientific Research and Design Institute for Water Supply and Sewage, Moscow Executive Committee, Member of the Working Group

Rovinsky F.Ya.

- Head of the Department, Institute of Applied Geophysics, Hydrometeorological Service of the USSR, Member of the Working Group

Kolesnikov L.N.

- Deputy Chief, Department for Scientific and Technical Cooperation with Foreign Countries, USSR Ministry for Reclamation and Water Management, Member of the Working Group

Korbut S.F.

- Economist, Department for Scientific and Technical Cooperation with Foreign Countries, USSR Ministry for Reclamation and Water Management, Member of the Working Group, Secretary.

Appendix 2

PROGRAM

of US-USSR Cooperation in the Field of Environmental Protection.

Problem II - Prevention of water pollution.

Item No	Project; section	Leading organization and expert responsible for the project	Point of cooperation
1	2	3	4
	<u>I. Studies and modelling of river basin pollution</u>	US Environmental Protection Agency, M. Pisano.	Mutual investigation in river basins: USSR - the Severn, Donets and the Moskva Rivers.
		All-Union Scientific Research Institute on Water Protection (VNIIV), USSR, V.R. Lozansky.	USA - Delaware and Ohio Rivers.
		Institute of Applied Geophysics, USSR, F.Ye. Rovinsky.	

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Section 1.

Investigation required to obtain data for assessing river water quality change under the influence of natural and man-made factors.

Section 2.

Development of the methods of analysis for planning and management of river water quality.

1973 -- exchange of scientific, technical and planning information on the results of studies;

Third quarter of 1973 -- visit of Soviet Specialists to the USA to study the works on the Delaware River and Ohio River, USA.

1974 -- visits of USSR and US specialists to the project areas as required.

Third quarter of 1975 -- symposium on results of planning -- including mathematical modelling, monitoring processes, and comparative evaluation of management systems, USSR.

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Section 3.

Implementation of a management system for providing required river water quality including estimation of the relative efficiency of the control methods under the legal constraints of each country.

Note. Approaches employed in mutual planning and management efforts will utilize optimization techniques, however mutual research efforts on ecological models to be used for planning will be reviewed.

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II. Protection and management of lakes  
and estuaries

US Environmental Protection  
Agency A.B. Joseph.  
USSR Institute of Hydro-  
chemistry, A.A. Zenin.

Section 1.

Study of pollution effect on chemical  
composition of water in lakes and es-  
tuaries. Eutrophication of water bod-  
ies.

Stages of work

1.1. Evaluation of chemical balance, water  
balance and exchange of water among  
different zones of the lake.

1973-1974 - exchange of  
scientific and technical  
information on the results  
of studies.

IIIrd quarter of 1973 - vi-  
sit of US specialists to  
the Lake of Balkal.

September 1974 - visit of  
Soviet specialists to the  
USA to study the state of  
affairs in the field of  
protection of lakes and es-  
tuaries (the Lakes of

1

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Tahoe, one of the Great Lakes),  
USA.

1.2. Distribution of pollutants and their concentrations in lakes and estuaries under influence of the hydrometeorological conditions.

1.3. Methods of monitoring hydrobiological data relative to water quality.

Section 2.

Methods and mathematical models to determine the zones affected by industrial and domestic effluents in lakes and estuaries under influence of hydrological and hydrobiological conditions.

1973-1974 - exchange of scientific and technical information.  
Third quarter of 1975 - possible symposium on mathematical modeling of processes involved in formulation of water quality criteria, USSR.

1	2	3	4
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Stages of work

2.1. Algorithm to determine velocity fields and concentrations of pollutants in deep lakes which are subject to thermal stratification regarding the measures for water quality control.

2.2. Algorithm to determine velocity fields and concentrations of pollutants in shallow lakes regarding the measures for water quality control.

2.3. Algorithm to determine velocity fields and concentrations of pollutants in estuaries regarding the measures for water quality control.

Tentative, to be discussed at Lake Baikal meeting, August, 1973, USSR.

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Section 3.

Systems for preventing pollution of lakes and estuaries.

US Environmental Protection Agency, A.B. Joseph.

USSR, VNIIV, E. Eremenko.

Stages of work

1. Study and evaluation of efficiency of

water protection measures which are under way on the Lake of Baikal in the USSR and on the Lakes of Tahoe and one of the Great Lakes in the USA.

IIIrd quarter of 1973 - visit by US specialists to the Baikal pulp and paper plant to study the work of treatment facilities (see Section 1), USSR.

2. Methods of optimization of measures for preventing pollution of lakes and estuaries.

IIInd quarter of 1976 - symposium on methods of planning and management for the protection of lakes and estuaries against pollution, USSR.

1	2	3	4
	III. <u>Effect of pollutants upon aquatic</u>	US Environmental Pro-	1973-1974 - exchange of infor-
	<u>systems and permissible levels of</u>	tection Agency	mation.
	<u>pollution</u>	D.I. Mount.	Exchange of visits:
		Institute of Zoology	1974 - visit of Soviet specia-
		of the USSR Academy	lists to the USA and partici-
		of Sciences,	pation in symposium; 1976 - vi-
		G.G. Vinberg.	sit of US specialists to the
			USSR.

#### Section 1.

Study of the pollutants effect on water ecosystems including self-purification processes.

1.1. Evaluation of productivity changes of separate groups and trophic levels of water organisms and their participation (role) in self-purification processes (assimilation capacity).

1.2. Development of methods of forecasting the biological processes in water bodi-

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4

es subject to pollution.

## Section 2.

Development of water quality standards providing for normal conditions in water biota habitat.

1. Methods, procedures and information required for establishing permissible concentrations for water organisms and the principles of water toxicology.

2. Development, comparison and standardization of methods (primarily field methods) of water quality biological control, degree of pollution and self-purification efficiency (rate of assimilation).

1974 - symposium on the problem of pollutants effect on ecosystems, USA.

10.

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3

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IV. Prevention or treatment of waste discharges

US Environmental Protection Agency, K. Johnson, Deputy Director, Municipal Waste Water Systems Division. Exchange of visits: 1973 - visit of US specialists to the USSR. IIInd-IIIrd quarters of 1974 - visit of Soviet specialists to the USA. Further exchange of visits shall be agreed upon in the course of cooperation.

Engineering Hydrogeology (VODGEO), USSR S.V. Yakovlev.

Section 1.

August 1973 - initial exchange of information.

Improvement of recycling water supply of pulp and paper plants using municipal and industrial waste waters.

1	2	3	4
<u>Section 2.</u> Improvement of existing and development of new highly productive municipal and industrial waste water treatment plants.		August 1973 - initial exchange of information.	
<u>Stages of work</u> 21. Study of hydrocyclons, multi-stage settling tanks and flotation plants. 22. Study of accelerators and apparatuses using technical oxygen for biological treatment (oxitanks). 23. Development of methods and plants to remove biogenic elements from waste waters.		August 1973 - initial exchange of information.	
<u>Section 3.</u> Improvement of waste water treatment process of oil refineries with an aim of maximum water recycling.			

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2

Stages of work

- 3.1. Improvement of oil-product removing plants.
- 3.2. Intensification of process of biological treatment of oil-containing waste waters.
- 3.3. Study of methods of tertiary treatment of oil-containing waste waters.
- 3.4. Disposal of oil-containing wastes.

Section 4.

Treatment and disposal of residues of municipal and industrial wastes.

Stages of work

- 4.1. Non-reagent methods of residue pretreatment (conditioning) for mechanical dewatering.
- 4.2. Intensification of mechanical dewatering process.
- 4.3. Incineration of organic residues of waste waters.
- 4.4. Application of sludge to the land and its use in agriculture and land reclamation.

Oct. 1973-initial exchange of information.

INFORMATION

of the Working Group on the Results of Discussion  
of Project IV: "Prevention or Treatment of Waste Discharges"

US Specialists

Kenneth L. Johnson

Roger Strelow

USSR Specialists

S.V. Yakovlev

V.I. Filippov

I.N. Myasnikov

I.L. Mongait

L.S. Krivitakaya

In accordance with the US-USSR Agreement on Cooperation in the Field of Environmental Protection, the Working Group has studied the proposals of the sides concerning the Program of Cooperation on Project IV and has come to the following conclusion.

As a result of exchange of views and discussion of proposals there has been specified the Program of Cooperation on Project IV, agreed upon the dates of information submission and exchange of visits.

In the process of discussions the following additions and amendments have been introduced into the Program of Cooperation:

The title of Section 2 has been specified as follows:

"Improvement of existing and development of new highly productive municipal and industrial waste water treatment plants".

The title of Section 4 has been specified as follows:

"Treatment and disposal of residues of municipal and industrial wastes".

Besides, Section 4 has been supplemented by Item 4.4

"Application of sludge to the land and its use in agriculture and land reclamation"

- 2 -

The leading organizations and the experts responsible for Project IV have been defined as follows: US side - Environmental Protection Agency, expert responsible for the Project - K. Johnson, Deputy Director, Municipal Waste Water Systems Division; USSR side - VODGEO, expert responsible for the Project - Prof. S. V. Yakovlev.

The initial exchange of information under Sections 1, 2, 3 has been planned for August, 1973, and under Section 4 - October, 1973.

The visit to the USSR in December, 1973, of a total delegation of 6-8 US specialists engaged in each of the four work sections, and the visit of Soviet specialists to the USA in the IIInd-IIIrd quarters of 1974 have been preliminarily agreed upon.

The requests of the visiting side will be taken into consideration when specifying the programs of visits.

The visits would establish the basis for further cooperation, joint studies and joint projects of practical application in each work area.

The USSR side will study the proposal of the US specialists concerning the organization of a joint exhibition of equipment and methods for solving the problems of waste water treatment.

Appendix 3

P R O G R A M

of the US Specialists' Visit to the USSR in August, 1973

Project II: Protection and Management of  
Lakes and Estuaries.

The purpose of cooperation in this field is the exchange of information and discussion of measures related to problems concerning the study of possibilities for preventing the pollution of lakes and estuaries, the Great Lakes, Tahoe (USA) and Baikal (USSR) are taken as an example.

In accordance with the program of work on Project II and using the experience gained in activities related to the water quality control in Lake Baikal and its tributaries the Soviet side suggests that during the period of US specialists visit to the USSR they should be supplied with information covering the following:

1. The main principles of organization and implementation of hydrochemical and hydrological surveys at Lake Baikal; results of study of waste waters effect on chemical composition of the Baikal Lake water.
2. Elements of chemicals balance in the lake water.
3. Water balance and exchange of water among different zones of the lake.
4. Methods and results of the hydrobiological regime observations at the lake.

Similar information on the Great Lakes and Lake Tahoe would be of interest for the USSR side.

The exchange of information on the said problems shall be effected at joint sessions in Moscow and the Baikal area, and

- 2 -

the US specialists will have an opportunity to visit Lake Baikal. The detailed program of visit to Lake Baikal will be directed to the US side two months before the arrival of specialists in the USSR.

This program should be considered together with the program of visit of Soviet specialists to the Great Lakes and Lake Tahoe, prepared by the US side.

OFFERS OF AMERICAN SIDE ON  
A PROGRAM OF THE SOVIET SPECIALISTS VISIT TO  
THE USA IN 1973 (PROJECT I)

The Environmental Protection Agency will arrange visits to the Delaware River and to another River, for example the Ohio River.

A) Delaware River

1) Visit the Delaware River site including visits to select industries, and meetings with local and regional officials.

2) Review of the Delaware River Plan - Including an explanation of the mathematical model and the economic analysis used, and a discussion of the application of the plan.

B) Ohio River

1) Visit the Ohio River Site including visits to selected industries, and meeting with local and state officials.

2) Mutual development of a plan of study, for the Ohio. The same plan of study is to be used on the Seversky Donets and Moskva Rivers.

3) Training of Soviet scientists on mathematical models, and planning and monitoring techniques.

Summary of Field Visits During Working Group Visit

A. Kuriyanovo Municipal Treatment Station

The Kuriyanovo Station treats two million cubic meters (528 million gallons) of wastewater per day. The plant is a secondary treatment, activated sludge, facility with a stated effluent quality of 10 ppm BOD and 12ppm suspended solids. Discharge is to the Moscow River. The Moscow River flow is approximately 60 cubic meters per second. The plant handles domestic sewage and industrial process water. Chlorination of the treated effluent is not now conducted, but is scheduled for the immediate future.

Construction is proceeding on sand filters for one million cubic meters per day of wastewater, which will have a resultant effluent quality of 6 ppm suspended solids and 4 ppm BOD.

Seven million cubic meters of sludge, with a water content of 97%, are produced each year. In the plant, the sludge is treated as follow:

1. Primary and secondary sludge is digested at 52°C.
2. The digested sludge is transferred to vacuum filters, where the water content is reduced to 78%.
3. The sludge is treated with chloride ions and lime.
4. A fraction of the sludge is heat dried in large drums to 20-30% water content.
5. The resulting material and sludge not dewatered is used for agricultural purposes.

The Soviets do not place much stress on plant decor and are primarily concerned with function rather than appearance. There was no evidence, however, that equipment was not properly maintained. Of particular interest was the fact that women constituted a significant portion of the work force in all facets of the operation.

An additional feature pointed out by officials was a new settling basin for demonstration projects. Sewage and industrial waste water was collected in the basin, oil was burned off the surface of the water in the basin with great success, according to the officials, and with no air pollution.

-2-

Future plans for Moscow waste treatment include a year 2000 scheme for combining all domestic and industrial process water, plus storm water, into a large gravity feed tunnel leading to a central treatment facility outside the city. Eight million cubic meters of water would be handled daily.

B. Likhachev Automobile Plant

100,000 cubic meters of process water are treated at this plant each day. The wastewaters include such materials as petroleum products, cyanides, chromium, acids, and solids. 50% of the treated "water is recycled, with 50% discharged to the Moscow River.

Pretreatment of certain contaminants is conducted near work locations at neutralization stations. The pre-treated material is then transferred to one of four treatment complexes where additional treatment, such as oil and solids separation, is performed. Regeneration of materials such as pickling acids is conducted, and, where possible, petroleum products are returned to production. Waste petroleum materials are incinerated.

Whenever it can be accomplished, the Soviets are interested in water recycling and "staged" water use. For example, relatively cold water is used for compression cooling, and then transferred for additional use in foundry cupola cooling.

Bonuses are given to the treatment plant employees if effluent standards are achieved or bettered. Economic incentives are also in use wherein reclaimed materials are "sold" to users at rates, in some cases, of 3-4 times the cost of reclamation.

Although the influent to the final treatment complex was noticeably full of oils and sediments, and smelled strongly of petroleum products, the effluent (to the naked eye) was clear and it was odor free.

A continuous problem to the Soviets concerns the disposal of residues and sludges. The solids separated from the wastewaters are de-watered in vacuum filters, and then transported to land disposal sites. No monitoring of the constituent quality of the disposed sludge is made, nor are investigations conducted of leachate from the sludge. Plans are being prepared for the use of reclaimed solids as building materials.

-3-

C. Description of Moscow-Oka Basin Inspection Organization

During the visit to the Likhachev plant, a description was made of the Moscow-Oka Basin Inspection organization. This description can be summarized, as follows:

1. The jurisdiction includes the Upper Volga, Oka River, Moscow River, and Moscow-Volga canal. 200,000 KM<sup>2</sup> are included in the area, with 120 towns and cities, 16,000,000 people, 6,000 industries, 89 lakes, and 75 reservoirs.
2. The administrative structure of the organization includes a central basin inspection station and laboratory in Moscow, with 11 local stations and laboratories.
3. 21,000,000 M<sup>3</sup> of water are consumed each day, and 19,500,000 M<sup>3</sup> are discharged. Only 400,000 M<sup>3</sup> are discharged without treatment.
4. There are 1969 active treatment units in the jurisdiction, with 119 of the units being municipal units.
5. The organization maintains 158 sampling points, and takes 5600 samples per year. 70,000 separate analyses are made. Samples are taken monthly. No automatic, continuous monitors are utilized, but are desired for the future. Present monitoring is performed for such items as: oil products, dissolved oxygen, phenols, and chromium.
6. The inspection organization provides evidence for enforcement actions, if standards are violated. Inspections are made for 2500 industries yearly. Among enforcement actions cited were the withdrawal of bonuses for 350 plant directors because of excessive discharges.
7. The organization reviews plans and specifications for approximately 400-500 new facilities annually.
8. Five waste treatment facilities are stationed on the rivers, specifically for vessel wastes.
9. The dissolved oxygen values for the Moscow River currently range from 6 to 10 ppm.